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## ON THE SEEDS OF RICINUS COMMUNIS.

BY EMIL LOUIS BOERNER, PH.G.

(*From an Inaugural Essay.*)

The acrid principle of ricinus seeds is but in a slight degree extracted in the expression of the oil, and the residual marc, as left by the manufacturer of castor oil, would, therefore, contain the greater portion of it, and was the material operated upon.

The coarse particles, which were liable to interfere with percolation, being rejected, four different portions, of 1,000 grains each, were treated respectively with gasolin, bisulphide of carbon, ether, and alcohol, until exhausted; the various menstrua evaporated, and the residues weighed, yielding from gasolin 6·9 per cent.; bisulphide of carbon, 11·77 per cent.; ether, 14 per cent., and alcohol, 21·2 per cent. The first three appeared to be pure oil, and were of a light yellow color, while the alcohol residue was much darker, and contained considerable coloring matter, which was deposited upon standing.

The marc which had been exhausted with gasolin was further treated with bisulphide of carbon, resulting in an additional 5·37 per cent. of oily residue from which, after a few days' standing, acicular crystals separated, which were insoluble in gasolin, partly soluble in ether, and in alcohol. A second attempt to obtain the crystals was unsuccessful. That portion of marc which had been treated with bisulphide of carbon yielded nothing to gasolin upon subsequent treatment with this menstruum.

A portion of exhausted marc was macerated with water until decomposed, requiring for the process about fourteen days. It was then strained, to separate coarser particles, and distilled; the distillate, having an acid reaction and an odor resembling that of decayed cheese, was treated with carbonate of zinc and filtered; upon concentration of the filtrate, crystals of butyrate of zinc separated. Both crystals and

mother-liquor, when shaken with sulphuric acid and alcohol, immediately developed, in a marked degree, the odor of butyric ether. A portion of this ethereal liquid neutralized with ammonia, was unaffected by the addition of ferric chloride, thus indicating the absence of an acetate.

An experiment was made similar to the one of Prof. Tuson, in which he found a crystallizable substance supposed to be an alkaloid.

A portion of the marc was boiled with successive portions of water, the several liquids strained through muslin, and the resulting decoction evaporated to the consistence of a soft extract, which was exhausted with boiling alcohol. Upon standing, a substance of a resinous appearance, but soluble in water, separated from the filtrate, and was removed by a second filtration. The filtrate was concentrated, and, as no crystals separated, magnesia was added, the mixture evaporated to dryness, again exhausted with boiling alcohol, and filtered, when, upon concentration and a few days' standing, colorless crystals, having the form of rectangular prisms and tables, separated, answering to the appearance of those obtained by Prof. Tuson. These crystals were slowly soluble in hot water. In an acidulated solution of the crystals, phosphomolybdic acid, tannic acid and iodohydrargyrate of potassium produced neither a precipitate nor a coloration; while in the mother-liquor precipitates were at once formed by the two first-named reagents, but by the last one only after some hours, and in amount about one-eighth that formed by phosphomolybdic acid. The mother-liquor, when heated with solid hydrate of potassium, developed the odor of ammonia. From these the writer concludes that the crystalline substance in question is not an alkaloid.

A substance resembling emulsin was obtained by forming an emulsion of the marc with water, adding an equal bulk of ether, and agitating repeatedly during twenty-four hours, when, upon standing, the liquid separated into two layers; the supernatant liquid being removed, alcohol was added to the other, which precipitated the emulsin. This emulsin, with amygdalin, in the presence of water, developed the odor of hydrocyanic acid after several days' standing. The result of Mr. H. Bower ("Amer. Jour. Phar.," 1854, p. 208) is confirmed by this experiment.

The residue obtained from the alcoholic percolate having deposited a semi-solid portion, largely composed of coloring matter, was agitated with ether, which took up the oil. The part left undissolved by the

ether was treated with successive portions of alcohol until but a few grains were left; this, containing a number of minute crystals, and having a very sweet taste, was dissolved in water. The application of Trommer's test proved the presence of sugar. A drop of the aqueous solution, placed on a microscope slide, and evaporated, plainly revealed the presence of cane sugar.

As the best authorities agree in placing the amount of fixed oil obtained from the kernels of the seeds at less than 50 per cent., it would seem that, as more than 11 per cent. is obtainable from the marc as rejected by the manufacturer by treatment with bisulphide of carbon, the latter oil could be produced at a less cost than an inferior quality of the expressed article, and answer the same purpose for use in the arts.

The writer intends making further experiments to determine the amount of butyric acid obtainable from the marc, by a process similar to the one above described.

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## SIUM LATIFOLIUM,

(*Water Parsnip, nat. order Umbelliferæ, Gray.*)

BY NATHAN ROGERS, PH.G.

(*Abstract from an Inaugural Essay presented to the California College of Pharmacy.*)

Attention having been recently directed to this plant (see "Amer. Jour. Phar.," 1873, p. 371), the writer concluded from its stated marked poisonous properties to subject the plant to a chemical examination.

The water parsnip is an aquatic plant very common in the swamps and along the water courses of the valleys of the Pacific slope. Its root is creeping,[1] stem erect, angular, leaves pinnate, leaflets ovate, lanceolate, sessile smooth, serrate, sometimes pinnatifid; flowers white, large rayed, involucres many-leaved, umbels terminal. The leaves of the plant, when found growing in water, are generally bi-pinnatifid. In appearance, growth, odor and taste it is closely allied to its innocent congener, the Pastinaca sativa. On account of this resemblance, it has frequently been productive of dangerous results, when eaten through mistake for the harmless and nutritious tuber of that edible species.

[1] This statement does not agree with the brief description given by Mr. A. R. Porter on page 349 of this volume. The root examined by the latter had been sent by Dr. C. B. White, U. S. A., to Mr. F. B. Power.—EDITOR.

The root being considered the most active part of the plant, it was deemed proper to subject that part to a chemical examination.

A portion of the root, cut up fine, was introduced into boiling water, contained in a retort, and a volatile oil obtained, which had a light-straw color, neutral reaction and possessed a pungent odor, resembling somewhat the peculiar odor of carrots. A cold infusion of the fresh root, acidulated with hydrochloric acid, and filtered, to separate a precipitate, failed to give a precipitate with iodohydrargyrate of potassium; but when distilled with an excess of potassa solution, a perfectly clear and colorless distillate was obtained, possessing a strong alkaline reaction and a peculiar mouse-like odor, somewhat similar to that of conium; after neutralization with hydrochloric acid, however, not the slightest precipitate was accasioned by phosphomolybdic acid, iodohydrargyrate of potassium or potassium cadmic iodide.

The neutralized distillate was next concentrated on a water-bath, and then allowed to evaporate spontaneously over sulphuric acid, which resulted in the deposition of long, slender, colorless needle-shaped crystals. On the addition of milk of lime a peculiar alkaline volatile principle was instantly liberated from its combination, and distinctly recognized by its disagreeable mouse like odor, and the property of restoring the blue color to reddened litmus.

Following Wittstein's process for preparing pastinacina, the alkaline distillate was freed from the volatile oil, neutralized with sulphuric acid, evaporated and treated with etherized alcohol to remove ammonium sulphate, the filtrate evaporated to a syrupy consistency and distilled with solution of potassa, gave a distillate which possessed an alkaline reaction, a urinous odor and a pungent taste. After neutralizing with sulphuric acid, needle-shaped crystals were obtained. This *alkaloid* appears to be analogous to pastinacina.[1]

A spirituous tincture of the root was mixed with water, and the alcohol and volatile oil distilled off; the dark reddish-brown resin removed from the aqueous liquid was soluble in ether and alcohol, and produced in the throat an unpleasant, burning sensation. Weak ammonia dissolved from this *two acid resins*, which were precipitated, the one by acetate, the other by subacetate of lead. The portion insoluble in ammonia consisted in part of *an indifferent resin*. It was dissolved

[1] Wittstein's pastinacina has an insignificant (unbedeutend) and scarcely somewhat acrid (scharf) taste. See "Buchn. Repertorium," vol. 68, p. 18.—EDITOR.

in alcohol, precipitated by a spirituous solution of lead acetate, the precipitate decomposed by sulphuretted hydrogen, and the sulphide of lead treated with boiling alcohol, from which, on cooling, shining colorless needles of a neutral principle separated, which were insoluble in pure and acidulated water, but soluble in ether, and from platinum foil volatilizable without charring. The aqueous filtrate from the resin obtained above was evaporated, and the residue incinerated; the ashes contained salts of *potassium*, *sodium*, *calcium* and *magnesium*.

On examining a section of the root under the microscope, *starch granules* were found to be quite plentifully around the medullary sheath and near the cortical portion. They polarized but feebly, were oblong, different in size and quite small. *Sugar*, *albumen* and *gum* were found in the cold infusion by appropriate tests.

*Medicinal Effects.*—From experiments made upon dogs, the volatile alkali and the neutral crystallizable principle were both found to be perfectly inert, while the resinous mass, in ten-grain doses, was found to lessen the frequency and the force of the heart's beat, producing also dizziness, vomiting and purging, with slight convulsive movements. These poisonous symptoms having gradually disappeared, the animals were left in a prostrate, weakened condition, from which they slowly recovered.

*San Francisco, Cal.*, February 10th, 1876.

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## ON THE ROOT OF EUPHORBIA IPECACUANHA.

BY PHILIPP H. DILG, PH.G.

(*Abstract from an Inaugural Essay.*)

The author collected the root in New Jersey late in September, and on repeating some of Mr. Petzelt's experiments (see "Amer. Jour. Phar.," 1873, p. 256) did not obtain any reaction for glucose until after the decoction had been boiled with an acid.

The alcoholic extract obtained by spontaneous evaporation was of a light-brown color and contained some crystals; ether extracted from it some oil and waxy matter, and a compound, which, on evaporation from petroleum benzin, yielded clusters of radiating crystals.

On percolating the root with petroleum benzin and evaporating the menstruum, a yellow tenacious mass, intermingled with thin colorless needles, was obtained. This benzin extract was completely dissolved by chloroform and bisulphide of carbon, the latter solution being tur-

bid; ether dissolved it partially, leaving a white flakey residue, and alcohol acquired a yellow color without affecting the shape of the extract, which appears to consist mainly of caoutchone. From the alcoholic solution a warty crystalline mass was obtained, which responded to the test for euphorbon as given by Flückiger ("Pharmacographia," p. 504).

The author did not succeed in isolating the emetic principle, and in concluding his essay, he states that only two houses in this city quote Euphorbia ipecacuanha in their price lists, but one only had it in stock, charging for it 75 cents per pound. On examining a dozen price lists from eclectic druggists in different parts of the country, one from Boston was the only one quoting it, and from that house a package was obtained, marked Euphorbia Americana, but containing the root of Gillenia stipulacea.[1] If it was ever used to any extent, the drug has evidently become obsolete and might well be dropped from the "Pharmacopœia."

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## GENTIAN ROOT SAID TO CONTAIN TANNIN.

BY JOHN M. MAISCH.

In a paper published in the March number of this journal (p. 117-121), the writer has discussed the question, whether gentian root contains tannin, and from his experiments and the investigations of others, arrived at the conclusion that tannin is entirely absent, and that the inky coloration, occurring on the addition of ferric chloride to a strong infusion of gentian is due to gentianic (gentisic) acid and to the presence of a body producing a dark green fluorescence.

A brief abstract of the paper, giving the principal results, has found its way into the "Pharmaceutische Centralhalle" of July 13, and is there accompanied by a statement from Dr. Hager, of which the following is a translation:

"Gentian root is collected from different species of Gentiana. It is therefore explainable that one sample may be free from tannin, while another may contain it. This observation has been repeatedly made in the preparation of Hager's quinia and iron pills; hence the remark in Hager's "Phar. Praxis," vol. II, p. 23: 'the roots of some of

[1] Our experience has been similar to that of Mr. Dilg; several years ago we were unable to find this root in the market, and on several occasions were supplied with the root of Gill. stipulacea.—EDITOR.

the mentioned species of gentiana contain also iron blueing tannin." It must not be surprising if pills containing iron with gentian are obtained from one apothecary's store of a brown, and from another of a black mass."

On referring to the new work by Hager, we find only the brief statement quoted above, without any further indication as to the observations upon which the conclusion is based. The species mentioned as yielding some of the commercial root are G. purpurea, *Lin.*, G. pannonica, *Scopoli*, and G. punctatà, *Lin.*, the same species which are usually enumerated in works on materia medica as being sometimes collected with G. lutea, *Lin.* Since they appear to have been medicinally employed for a long time, one being even officinal in Austria, it would seem surprising that the presence of tannin in one or the other should not have been observed before. If the variation in color of pills containing a salt of iron, and prepared with extract of gentian, has led Hager to the above statement, it seems to be precisely as correct to assume that the extract had been prepared from a carelessly collected gentian root, in which the presence of some foreign astringent root had been overlooked.

The root of Gentiana crinita, *Froel.*, which had been collected last year near Philadelphia, is free from tannin, and the same must be said from a root very similar in appearanee, and which was received from North Carolina as the root of G. Catesbæi, *Walt.* We are therefore, it seems to me, justified to regard the medicinal gentian roots as being *free from tannin*, until positive proof to the contrary is produced.

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## ON SYRUP OF LIQUORICE ROOT AND BROWN MIXTURE.

BY A. P. BROWN, PH.G.

(*Read at the Pharmaceutical Meeting October 17th.*)

A short time ago, having occasion to make some ammoniacal glycyrrhizin, it occurred to me that the use of ammonia in preparing syrup of liquorice root would be an advantage, I therefore devised the following formula:

| | | |
|---|---|---|
| Take of | Liquorice root, . . . | 4 troyounces |
| | Cold water, . . . . | q. s. |
| | Water of ammonia, . . | 1 fluidounce |
| | Granulated sugar, . . . | 13 troyounces. |

Grind the root in a mill, and place it in a wide-mouth bottle, with a

tightly-fitting stopper, pour upon it one pint of water, mixed with the water of ammonia, macerate for forty-eight hours, then transfer it to a funnel and allow the liquid to drain from it, and add sufficient water until two pints of liquid has passed; allow it to stand until the particles have subsided, then decant and evaporate to eight fluidounces, filter and, having added the sugar, dissolve it with the aid of heat.

Experiments were made with the ordinary liquorice root and the Russian peeled root, and of the two the syrup made from the Russian root is decidedly the finest. The cortical portion of liquorice root is acrid, without possessing the peculiar virtues of the root, the Russian root, being deprived of the epidermis, will, of course, make the best preparation.

The syrup thus prepared is of a dark-brown color, and contains all the sweet principles of the root without the starch and other inert matter. It is used to mask the bitterness of quinia, and is well adapted for children.

Sulphate of magnesium, iodide and bromide of potassium loose most of their taste when mixed with this syrup.

I have prepared brown mixture from liquorice root and ammonia by the following process:

| | | |
|---|---|---|
| Take of | Liquorice root, . . . | 4 troyounces |
| | Water of ammonia, . . | 1 fluidounce |
| | Water, . . . . | q. s. |

Proceed in the same manner as for syrup of liquorice root, but instead of evaporating to eight fluidounces, evaporated to twelve fluidounces, and mix this with the gum arabic, sugar and other ingredients. Lastly, add water of ammonia until a clear solution is obtained, taking care not to add an excess.

Brown mixture, prepared by the above process, is of a brownish-yellow color, and almost entirely free from sediment.

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## MIXTURES OF QUINIA AND AMMONIA.

BY WILLIAM McINTYRE, PH.G.

(*Read at Social Meeting of Alumni Association of the College of Pharmacy, Oct.* 5, 1876.)

While quinia and ammonia are incompatible, an excess of the latter will determine a solution, and a pharmaceutical preparation of this character is not an impossibility.

Several formulæ have been published, and with the view of calling renewed attention to the subject, they are re-produced.

Liquor quiniæ ammoniatus (Bastick).

Take of Sulphate of quinia thirty-two grains;
Alcohol, 49 per cent., three and a half fluidounces;
Water of ammonia, half a fluidounce.

Diffuse the quinia in half the spirit, add ammonia to the remainder, and mix all together.

Tinctura quiniæ ammoniata (Ince).

Take of Sulphate of quinia, thirty-two grains;
Alcohol, 49 per cent., three and a half fluidounces;
Spirit of ammonia, half a fluidounce.

The increased alcoholic strength is considered an improvement by the author.

Liquor quiniæ ammoniatus (Squire).

Take of Sulphate of quinia, thirty-two grains;
Stronger water of ammonia, one fluidrachm;
Alcohol, 49 per cent., sufficient to make four fluidounces.

Mix as in the first formula.

Tinctura quiniæ ammoniata (Curtis).

Take of Quinia (alkaloid) thirty-two grains;
Aromatic spirit of ammonia, four fluidounces.

The quinia will readily dissolve in the spirit, and the strength of the preparation can be increased, if desired.

These solutions are permanent; with water they make turbid mixtures, and are too pungent to be taken undiluted.

NOTE BY THE EDITOR.—The following, which is taken from Squire's "Pharmacopœias of the London Hospitals," agrees with the three first formulas in quinia strength, but is notably stronger in ammonia and alcohol.

*Liquor Quiniæ Ammoniatus.*—Sulphate of quinia, twenty-four grains; strong solution of ammonia, four drachms; rectified spirit (sp. gr., 838) to three ounces. Dose, 30 to 60 minims.

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## PRACTICAL NOTES.

The following notes are gleaned from some of the essays presented to the Philadelphia College of Pharmacy last spring:

*Lactate of Iron.*—Instead of the officinal ferrous lactate, Louis P. Carbonell recommends the ferric lactate, which he succeeded to obtain in

light-brown transparent scales by following the process for the other scale preparations of iron, taking particular care to fully saturate the acid and to avoid high temperature during the whole operation. If the first precaution be overlooked, a more or less pasty mass will be the result, and if the temperature rises too high, a pulverulent salt will be obtained.

The scaled salt is freely soluble in water and alcohol.[1]

*Lactate of iron and quinia* and *lactate of iron and strychnia* may also be obtained in brown scales, have a bitter ferruginous taste and are soluble in alcohol and water.

*Phytolacca.*—Oliver P. Hooper gives the following formulas for preparations of the poke:

*Tinctura phytolaccæ baccæ concentrata.*

| | | |
|---|---|---|
| Take of | Poke berries, dried, . | ℥xvi |
| | Alcohol . . . | Oii |

Macerate for 14 days at a temperature of 90° F., express and filter. Dose for an adult, half a teaspoonful.

Alcohol extracts none of the red coloring matter, and the above tincture has a brown color like tincture of aconite root. The writer had known the tincture of poke berries employed with success in chronic rheumatism, in doses of about twenty drops, and combined with compound syrup of sarsaparilla and small doses of potassium iodide and wine of colchicum.

*Tinctura phytolaccæ radicis composita.*

| | | |
|---|---|---|
| Take of | Poke root, ground, . | ℥vi |
| | Cardamom, powdered, . | ℥ii |
| | Diluted alcohol, . . | Oii |

Macerate for 14 days and filter. Dose, as an alterative, 10 to 20 minims.

*Unguentum phytolaccæ radicis.*

| | | |
|---|---|---|
| Take of | Fresh poke root, . . | ℥ii |
| | Lard . . . . | ℥i |

Bruise the root until of a uniform pasty consistence, and mix with the lard. Has been recommended in scalled head and similar diseases.

The root roasted in hot ashes until soft, and then mashed and applied as a poultice, is unrivaled in felons and humors of various kinds.

*Cream of Camphor.*—Charles Griffith offers the following formula for

[1] Ferric hydrate dissolved in warm lactic acid, according to Wittstein, is gradually in part reduced to ferrous salt. According to Berzelius, ferric lactate is insoluble in alcohol.—See "Gmelin's Chemistry."—EDITOR.

a liniment, which is applicable in cases similar to those in which volatile limiment is used:

| | | |
|---|---|---|
| Take of | Castile soap, | ℥iss |
| | Water of ammonia, | f℥iss |
| | Camphor, | ℥vi |
| | Oil of turpentine, | f℥vi |
| | Chloride of ammonium, | ℥iss |
| | Water, | f℥xii |

Dissolve the soap shavings in one-half the water previously mixed with the ammonia, and the ammonium chloride in the other half; mix the solutions well, and add the camphor dissolved in the turpentine; then agitate briskly until the liquids are united and form a perfect emulsion.[1] Other active medicines may be added when indicated.

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## SOLUBILITY OF IODIDE AND BROMIDE OF AMMONIUM IN ETHER.

BY E. M. WELLS, PH.G.

During an investigation, I observed that iodide of ammonium is soluble in ether. Being desirous to know the extent of its solubility, I examined several standard works, but found nothing written on the subject. "Gmelin's Chemistry" (edition 1872) merely states that the salt is very deliquescent and easily soluble in water and alcohol, and similar statements are met with in other works.

From the results of the determinations as given below, it seems that both iodide and bromide of ammonium are not insoluble in pure ether, and that their solubility increases very considerably as the ether becomes weaker through the presence of alcohol.

An excess of the respective salts was put into a flask with a quantity of ether, and allowed to stand several hours, and was well shaken at short intervals. The temperature was from 60° F. to 65° F. The ethereal solutions were carefully poured in a tared beaker, well covered and weighed, then set aside to evaporate to dryness and re-weighed.

The results of the several experiments are given in the following table:

| Grs. of Ether, sp. gr. ·715. | Grs. of Ether, sp. gr. ·742. | Dissolved grs. Iodide of Ammonium. | Dissolved grs. Bromide of Ammon. | Per cent. |
|---|---|---|---|---|
| ·218 | . . . . | ·5 | . . . . . | ·22 |
| ·225 | . . . . | . . . . . | Amount very small | |
| | ·345 | ·9 | . . . . . | 2·60 |
| | ·249 | . . . . . | ·5 | ·20 |

[1] For a formula for a similar preparation see "Am. Jour. Phar.," 1875, p. 257 — EDITOR.

## GLEANINGS FROM THE DANISH JOURNALS.

BY HANS M. WILDER.

*Enameled Iron Pots.*—Werner-Cronquist and Eggertz found until 38 per cent. lead in the enamel. In a pot of 8 cubic inches capacity was boiled, for 3½ hours, 450 grams vinegar (10 per cent.), and yielded 0·014 grams lead.—*Arch. for Pharm.*, '76 p. 248, from *Hygiea*, 1876.

*Blaud's Pills.*—Aé recommends to keep on hand a mixture of ferri sulphas 15 parts, potass. carb. 15 parts and sugar 3 parts. If pills are prescribed to be made, for instance, from 15 parts each of sulph. ferri and pot. carb., 33 parts of the above mass is taken and made into pills with about 6 parts powdered marshmallow root. Pills thus made keep their shape and are easily digested.—*Ibid.*, p. 256, from *Arch. d. Ph.*

*Whether Trees have been Cut at the Right Season.*—Prillieux recommends iodine, which colors the cross section of trees cut in winter time yellow, with blueish-black lines. Trees cut at any other season will only be colored yellow by iodine.—*Ibid.*, p. 289, from Dingler.

*Pharmacopœia Danica.*—The second supplement contains the following additions: Acid. salicylic, bals. styrax, caffeina, iodoform; of preparations: Aqua chamomillæ concentrata. 100 parts recently distilled chamomile water are mixed with 2 parts alcohol, and therefrom distilled 10 parts. Likewise elder-flower water and linden-flower water.—*Ibid.*, p. 299.

*Pure nitrogen.*—Knapp produces it in short time and in quite considerable quantities by slightly heating a concentrated solution of 53·5 chloride of ammonium and 69 nitrate of sodium.—*Ibid.*, 356, from *Buchner*, 1876, p. 5.

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## THE DIFFERENT SYRUPS OF THE PHOSPHATES IN GENERAL USE.

BY ERNERT C. SAUNDERS.

The difference in the quality and strength of different samples of the preparation known as Parrish's Chemical Food, as found in the market at the present time, has been the subject of considerable discussion during the past few months, but as, with the exception of Mr. W. L. Howie in his useful and practical paper, all seem to have devoted their energies more to finding out faults in ordinary samples of the preparation than to remedying them, I venture to submit the following re-

marks on this article, and the somewhat similar one of Easton's Syrup, which is also difficult to make and to keep in good condition. I begin with Parrish's Syrup as perhaps the most difficult to make according to the ordinary formula.

The chief reason for the difference met with in the various makes of this preparation is to be found in the fact that the principal published formula, that in Parrish's "Pharmacy," is an utterly unpractical one. It is well known that glacial phosphoric acid, uncontaminated with phosphate of soda, is hardly to be found in the market at present; but even if it were, it is next to impossible to obtain a good preparation with it, as it is a monobasic acid, while the direction to add "quantum sufficit" of hydrochloric acid is exceedingly vague. But apart from this, it is evident that the formula cannot be strictly followed, as if the quantity of ferrous phosphate directed to be present in each fluidrachm of the completed syrup is attended to, 32 troyounces of sugar will have to be made into 36 fluidounces of syrup—a manifest impossibility; while, if the quantity given as the amount of solution to be formed for the sugar to be dissolved in is adhered to, the result will be about 46 fluidounces of syrup, which will not contain the requisite amount per drachm of iron and lime. All the formulæ at present in use seem merely modifications of that given by Parrish. In the following form the author has only followed Parrish as far as the result to be obtained is concerned, viz., that the finished syrup shall contain in each fluidrachm 1 grain ferrous phosphate $Fe_3P_2O_8$, $2\frac{1}{2}$ grains calcic phosphate $Ca_3P_2O_8$, and traces of sodic and potassic phosphates, with free phosphoric acid.

| | | |
|---|---|---|
| Take of | Iron wire, clean, No. 20, . . . | 240 grains; |
| | Syrupy phosphoric acid (sp. gr. 1·75), | 3 oz. by weight; |
| | Water, distilled, . . . | 4 fluidounces. |

Mix the acid and water, and dissolve the wire in the mixture in a flask, loosely stopped with tow; the hydrogen evolved then protects the solution from oxidation. When all action has ceased, heat to boiling point, and filter through paper in a funnel with a long neck reaching to the bottom of a beaker containing a little syrup, which floating on the iron solution will effectually prevent any oxidation.

| | |
|---|---|
| Slaked lime, fresh, . . . | 923 grains; |
| Phosphoric acid (sp. gr. 1·75), . | 9½ oz. by weight; |
| Water, distilled, . . . | 14 fluidounces. |

Mix the acid and water, and dissolve the lime in the mixture. Filter the solution.

| | |
|---|---|
| Crystallized sodic carbonate, . . | 54 grains; |
| Potassic carbonate, . . | 72 grains; |
| Phosphoric acid (sp. gr. 1·75), . . | ½ oz. by weight; |
| Distilled water, . . . | 1 fluidounce. |

Dissolve and filter. Then mix all the solutions, and, having added distilled water to make the solution measure 28 fluidounces, dissolve in it with heat sugar, 3¼ lb.; powdered cochineal, 85 grains; and strain while hot. When cold, add orange-flower water, 2 fluidounces, and sufficient distilled water to make the whole measure 64 fluidounces. The product is a nice clear syrup, entirely free from sulphate of soda or ammonic chloride, both of which are by no means uncommon impurities, from the difficulty of washing the precipitates when the syrup is made in the old way, while the whole process will be found very much less troublesome and tedious. Calcic hydrate is generally sufficiently pure as commonly obtained, though where the chemist has the facilities for doing it, it is best for him to make the lime himself, by igniting precipitated chalk in a crucible, at a full red heat, for an hour.

I may remark here, though it does not exactly bear on the subject, that the last edition (1872) of Pereira's "Materia Medica" contains the astonishing information, on page 213, that "Hypophosphite of lime is an important constituent in Parrish's Chemical Food;" a statement that is liable to mislead physicians in a serious manner.

Easton's syrup is another preparation that is frequently badly made, and very often deficient in iron. The precipitate so frequently met with, in the form of phosphate of quinia, is, I think, always owing to the use of an acid containing metaphosphoric acid. I have never been troubled with a precipitate since I have taken pains to use only orthophosphoric acid, $H_3PO_4$. The change in color is due to exposure to the air, chiefly from oxidation of the iron salt, but partly to the quinia changing color. It may be entirely avoided, as has been often remarked, by completely filling the bottles in which the syrup is kept, and corking so as to have as little air left in the bottle as possible.

No trouble will be found in making a satisfactory preparation if the following form be strictly followed, and care taken to avoid exposure to the air of the iron solution.

| | | |
|---|---|---|
| Take of | Iron wire (No. 20), . . | 240 grains |
| | Phosphoric acid (sp. gr. 1·75), . | 3 oz. by weight |
| | Water, . . . . | 4 fluiduonces |

Dissolve with the precautions directed above in the formula for Parrish's syrup.

| | |
|---|---|
| Quinia sulph., . . . . | 625 grains |
| Liq. ammon., | |
| Distilled water, | |
| Dilute sulphuric acid, . . . | ăă q. s. |

Precipitate the quinia, secundum artem, and wash on a filter with a pint of very cold distilled water, press strongly, and dissolve in half an ounce, by weight, of phosphoric acid, diluted with an ounce of water in which 16 grains of strychnia have been dissolved. Mix with the solution of iron, add enough distilled water to make the whole measure 10 fluidounces, and mix thoroughly with 54 fluidounces of simple syrup. The resulting syrup will contain in each fluidrachm 1 grain ferrous phosphate $Fe_3P_2O_8$, 1 grain quinic phosphate $(C_{20}H_{24}N_2O_2)_32H_3PO_4$, and $\frac{1}{32}$ grain of strychnia.

These two syrups afford good examples of two classes of syrups that present considerable difficulties in manipulation with the formulæ in general use, which, I think, are quite removed in the two just submitted. both have now been tested on a large scale for some time, and found very satisfactory in their products. No originality is claimed in the use of metallic iron in place of precipitated ferrous phosphate; it was, I believe, first suggested by Mr. W. H. Jones, in the columns of the "Pharmaceutical Journal." The chief point that I would press, is the importance of using tribasic (ortho) phosphoric acid, $H_3PO_4$; both metaphosphoric acid, $HPO_3$, and pyrophosphoric acid, $H_4P_2O_7$, if present in the acid to even a small extent, are certain to cause trouble. The precaution given as to filtering the solution of ferrous phosphate will be found useful in many other cases; a beakerful of solution of ferrous iodide filtered in a similar manner, with a layer of syrup the eighth of an inch thick floating on the surface, can be left exposed for 24 hours without injury to the solution. It is, of course, necessary that the solution should have the greatest specific gravity.—*Pharm. Journ. and Trans.*, July 15, 1876.

## THE VARIATION IN STRENGTH OF THE OPIUM PREPARATIONS.

BY D. B. DOTT.

In the following communication, the subject of which is one of those suggested for investigation by the Conference, I give the results of an examination of a number of the official opium preparations. It was not thought necessary to test samples of all these preparations, but only of the tincture, extract, and liquid extract; the morphia-strength of which will probably afford a sufficiently accurate idea of the quality of the opium preparations at present supplied to the public. All the samples examined were procured from druggists of good standing in London, Dublin and Edinburgh.

In the first place I give the assays of a variety of opiums, with the amount of extract obtained from each. The percentage of extract was not found directly, but by subtracting the percentages of water and insoluble residue from 100, the difference being the percentage of dry extract. The proportion of the morphia in the extract is calculated from the result of the opium assay.

It will be seen from this table that the richest extract obtained would contain 34·4 per cent. of morphia, while the poorest would contain 13·7 per cent. Whence it is manifest that two chemists, starting with opiums perfectly answering the "Pharmacopœia" tests, and strictly following the officinal process, might succeed in preparing extracts, one of which would be more than twice the strength of the other.

| Description of Opium used. | Morphia per cent. | Water per cent. | Aqueous extract per cent. | Residue insoluble in water per ct. | Morphia in extract per cent. |
|---|---|---|---|---|---|
| 1. Turkey | 10·75 | 19·6 | 47·80 | 32·60 | 22·4 |
| 2. " | 12·30 | 20·0 | 51·15 | 28·85 | 24·0 |
| 3. " | 10·20 | 26·0 | 48·05 | 25·95 | 21·2 |
| 4. " | 7·57 | 21·2 | 54·90 | 23·70 | 13·7 |
| 5. " | 9·60 | 22·0 | 47·05 | 30·95 | 20·4 |
| 6. " | 11·69 | 18·4 | 56·15 | 25·45 | 20·8 |
| 7. " | 12·30 | 19·2 | 54·90 | 25·90 | 22·4 |
| 8. " | 12·30 | 20·4 | 45·40 | 34·20 | 27·0 |
| 9. " | 6·76 | 27·2 | 37·00 | 35·80 | 18·2 |
| 10. " | 9·80 | 21·2 | 40·00 | 38·80 | 24·5 |
| 11. " | 8·85 | 22.8 | 47·50 | 29·70 | 18·6 |
| 12. " | 6·93 | 31·2 | 20·10 | 47·90 | 34·4 |
| 13. Persian | 6.00 | 14·0 | 59·20 | 26·80 | 10·1 |
| 14. " | 8·50 | 12·0 | 60·60 | 27·40 | 14·0 |
| 15. " | 2·10 | 16·0 | 58·10 | 25·90 | 3·6 |
| 16. " in sticks | traces | 15·6 | 73·90 | 10·50 | traces |
| 17. Malwa | 7·30 | 15·2 | 60·70 | 24·10 | 12·0 |
| 18. " | 5·80 | 13 6 | 61·10 | 25·20 | 9·5 |
| 19. Egyptian | 7·00 | 14·8 | 56·90 | 28 30 | 12·3 |

In the next table I give the estimation of several samples of *Extractum Opii.*

| | Water per cent. | Morphia per cent. | | Morphia per cent. |
|---|---|---|---|---|
| No. 1 | 19·2 | 19·4 | No. 7 | 22·8 |
| No. 2 | 21·2 | 19·7 | No. 8 | 19·3 |
| No. 3 | 26·8 | 16·2 | No. 9 | 20·5 |
| No. 4 | 18·4 | 19·6 | No. 10 | 15·4 |
| No. 5 | 23·2 | 19 7 | No. 11 | 20·4 |
| No. 6 | 22·0 | 18·2 | | |

The difference between the maximum 22·8 and the minimum 15·4 is equal to a variation in the morphia-strength of about 3 to 4½. The average percentage is 19·7.

I next give a list of the samples of Extractum Opii Liquidum examined, with their specific gravities and the amount of morphia in the fluidounce.

| No. | Spec. Grav. | Grs. Morphia in fl. oz. | | | No. | Spec. Grav. | Grs. Morphia in fl. oz. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | I. | II. | mean | | | I. | II. | mean |
| 1 | 0·987 | 3·82 | 4·08 | 3·95 | 9 | 0·985 | 4·68 | 4 34 | 4·51 |
| 2 | 0·992 | 4·02 | 3·95 | 3·98 | 10 | 1·000 | 4·17 | 4·01 | 4·09 |
| 3 | 0 986 | 2·66 | 2·87 | 2·76 | 11 | 0·989 | 3·68 | 3·75 | 3·76 |
| 4 | 0·993 | 3·04 | 3·89 | 3·46 | 12 | | 3·71 | | |
| 5 | 0·996 | 3·73 | 3·12 | 3·42 | 13 | | 2·28 | | |
| 6 | 0·995 | 2·26 | 2·06 | 2·16 | 14 | | 0·61 | | |
| 7 | 0·992 | 1·78 | 1·63 | 1·66 | 15 | | 2·22 | | |
| 8 | 0·996 | 4·33 | 2·34 | 4·33 | | | | | |

It will be observed that in these fifteen samples the grains of morphia in the fluidounce varied from 0·6 to 4·5, the average being 3·12. Only one estimation of the last four was made, as these were examined some months ago, without any intention of publishing the results. In one or two cases it would have been advisable to repeat the determination of the morphia, but the quantity of each sample admitted of only two estimations being made.

In the following table I give the assays of eighteen samples of the Tinctura Opii, with their specific gravities.

| No. | Spec. Grav. | Grs. Morphia in fl. oz. | | | No. | Spec. Grav. | Grs. Morphia in fl. oz. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | I. | II. | mean | | | I. | II. | mean |
| 1 | ·922 | 3·30 | 3·50 | 3·40 | 10 | ·960 | 3·50 | 3·57 | 3·53 |
| 2 | ·938 | 2·80 | 2·70 | 2·75 | 12 | ·953 | 3·04 | | |
| 3 | ·955 | 2·10 | 2·10 | 2·10 | 11 | ·936 | 3·90 | | |
| 4 | ·940 | 2·90 | 3·70 | 3·30 | 13 | | 3·71 | | |
| 5 | ·956 | 2·05 | 2·10 | 2·07 | 14 | | 4·37 | | |
| 6 | ·937 | 2·08 | 2·23 | 2·15 | 15 | | 2·02 | | |
| 7 | ·929 | 3·12 | 3·28 | 3·20 | 16 | | 0·83 | | |
| 8 | ·957 | 3·62 | 3·45 | 3·53 | 17 | | 1·91 | | |
| 9 | ·962 | 1·40 | 1·59 | 1·49 | 18 | | 0·55 | | |

In this, the most important of the opium preparations, the variation of morphia strength extends from 4·37 to 0·65 grs. in the fluidounce; the average being 2·66.

The method employed in all the above-noted assays is a modification of that recommended in the British "Pharmacopœia." I find that the precipitate of crude morphia obtained in that process is equal on an average to $\frac{7}{10}$ths of its weight of the pure base. It is a process which I have every reason to believe gives at least as accurate results as those obtainable by any of the recognized methods.

I think the most obvious conclusion to be arrived at from the foregoing experiments, and from those of other observers, is that the opium preparations are not remedies to be relied on. When one considers that a physician who prescribes for his patient one drachm of laudanum, intending that the latter should receive thereby $\frac{1}{3}$ of a grain of morphia, may in reality be only giving him $\frac{1}{10}$th of a grain, it is manifest that this indicates a condition of things demanding amendment. It has been proposed by Dr. Squibb (reported in the "Year-Book for 1870") to prepare a strong tincture, assay it, and then dilute to the proper strength, or at least to prepare the tincture, etc., from assayed opium. I am afraid, however, that there would be great, if not insuperable, difficulty in getting this system brought into general use. The trouble involved in following such a plan would deter the majority of pharmacists from adopting it. For my own part, I believe the ultimate solution of the difficulty will be the abolition of all the galenical preparations of opium from the "Pharmacopœia." Indeed, unless opium possesses therapeutical properties which are not possessed by its alkaloids, there can be no reason for retaining it. That is a question, of course, to be decided by medical men. Still, I venture to think that

our knowledge of the physiological effects of opium and its constituents is sufficiently complete to enable us to affirm that all the objects for which opium is prescribed can be attained equally well by the use of its alkaloids. Among these only three can be said to have any practical importance, viz., morphia, codeia and narceina, which are all hypnotics, and seem to differ from one another mainly in the amount required to produce the desired effect. The other bases are either inert in ordinary doses, or exist in such minute quantities that the proportion of them in a large dose of laudanum could only produce a physiological effeet in the imagination of a homœopathist.

I believe that the chief work of pharmaceutical chemistry for a long time to come will consist in the perfecting of processes for the isolation of the active principles of the vegetable remedies, so that in due time all the mediæval tinctures and decoctions of the "Pharmocopœia" will become obsolete, and be superseded by preparations of definite and invariable strength. It is my sincere hope that this paper, meagre and imperfect though it is, may in some small measure be the means of hastening such a desirable consummation.—*Pharm. Jour. and Trans.* [Lond.], Sept. 16, 1876.

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## REPORT OF AN ASSAY OF OPIUM FOR MORPHIA.

BY EDWARD LAWRANCE CLEAVER, F.C.S.

In order to thoroughly criticize the different processes in present use for the estimation of morphia in opium it is necessary to have a thorough knowledge of the following points:

1. What are the constituents of opium?
2. In what state of combination do they exist?
3. The action of solvents and reagents on these principles.
4. The action of solvents on opium.
5. The action of alkalies on solutions of opium.
6. The action of heat, acids, etc., on morphia.

This paper will therefore be divided into two parts. The first consists of remarks on the foregoing heads; the second of the application of these remarks to point out the advantages and disadvantages of the existing processes used for opium analysis.

PART I.—The principal constituents of opium are as follows: Morphia, narcotina, narceina, codeina, thebaina, papaverina, a substance

resembling caoutchouc, probably two resins, meconic acid and calcium salts, and a substance we will designate by the name of extractive.

Of these the morphia in all probability exists combined with the meconic acid to form soluble meconate of morphia.

The narcotina is either entirely free or partly combined with acid.

The remaining alkaloids are probably in a state of combination.

The meconic acid is partly free and partly combined.

The action of different solvents and reagents on the principles of opium are as follows:

*Water (distilled).*—Morphia is soluble to the extent of one part in 1,000; narcotina in 10,000; narceina is sparingly soluble though more so than morphia; the meconic acid is freely soluble; the resin, caoutchouc, etc., are insoluble.

*Alcohol.*—Morphia is sparingly soluble in cold alcohol, freely in boiling. The remaining alkaloids, resin and caoutchouc are soluble.

*Fusel Oil.*—All the alkaloids are freely soluble in fusel oil. The resin is also slightly soluble.

*Ether, Benzol, Bisulphide of Carbon.*—Morphia is soluble to the extent of one part in 2,000; the remaining alkaloids are freely soluble. The resin is insoluble; caoutchouc soluble.

*Acids.*—The whole of the alkaloids and resins are soluble in acids.

*Fixed Alkalies.*—Morphia is freely soluble in solutions of fixed alkalies, narcotina is insoluble. In the presence of morphia narcotina is dissolved by lime water; narceina is soluble. The remaining alkaloids are insoluble. The resin is partly soluble.

*Ammonia.*—Morphia is sparingly soluble in ammonia, a 1 per cent. solution dissolving five parts in 1,000. The narceina and codeina are soluble. The remaining alkaloids and resin are insoluble.

### *Action of Solvents on Opium.*

It follows from the foregoing remarks that when opium is treated with water the solution contains meconate of morphia, salts of narcotina and other alkaloids; resin, taken into solution by the free acid present; calcium salts, meconic acid and extractive.

An alcoholic solution will, in addition to the above, contain more narcotina, caoutchouc, fat and resin.

The question here arises as to whether water will thoroughly exhaust the opium of its morphia. Opinions on this point are divided, but I

believe that, provided the solution produced be acid, water will effectually exhaust the marc.

It may be said that opium, after prolonged treatment with water, has a bitter taste, thus proving some constituent to be present; but that this bitterness is not due to morphia may be proved by treating the marc with benzol, ether or bisulphide of carbon, when the bitterness is entirely removed. Preliminary treatment with one of the above mentioned solvents is recommended by some authors, and this plan has the advantage that the quantity of water required for the after treatment of the opium is much less than if the preliminary exhaustion be omitted, and also that the narcotina being nearly all removed, the point of exhaustion is more easily noticed by the solution dropping through devoid of bitterness. It must, however, be remembered that a slight loss of morphia is entailed by the preliminary treatment, but the amount may be calculated by adding ·005 gr. for every 10 cc. of solvent used to the amount of morphia afterwards found.

Hot water is also recommended by some, but I do not think much advantage is gained by its use, as the following experiment will prove:

No. 1. 100 grains of dried powdered opium were treated with hot water. It yielded 69 per cent. of extract and 12·2 per cent. of brown crystalline morphia.

No. 2. 100 grains of the same opium were treated with cold water by percolators; five fluidounces of water were used and then the solution had a very bitter taste. It yielded 54·3 per cent. extract and 11·9 per cent. of colored crystalline morphia.

No. 3. 100 grains were treated first with boiling benzin and afterwards percolated with water. It required under three ounces of liquid to render the marc tasteless, whilst in the previous experiment five fluidounces were required, and even then the solution obtained was slightly bitter. The liquid yielded 54·7 per cent. of extract and 12.2 of colored crystalline morphia.

It will be seen from these experiments that although hot water dissolves more from opium than cold water, yet the yield of morphia is not greater. The effect, however, of first using benzin is more marked, and the increased yield of morphia I believe to be due to the fact that less water being used, less time was required to evaporate the solution, and thus destruction of the morphia by heat is avoided. I also tried the

effect of mixing opium with chalk, and then adding water, and percolating.

100 grains of opium, as before, yielded 45 per cent. of extract, which gave 11·9 per cent. of brown crystalline morphia.

The difference in extract yielded by the plan is due to the fact that the free acid being neutralized by the chalk, the meconic acid, part of resin, the whole of the meconate of calcium, and part of narcotina, are removed from solution and so diminish the weight of extract obtained.

The results obtained by this process, compared with others, will be given further on.

*Action of Alkalies on Infusion and Tincture of Opium.*

*Ammonia.*—If excess of solution of ammonia be added to infusion of opium a precipitate is obtained, which consists chiefly of morphia, but contains small quantities of narcotina and other alkaloids, meconate of calcium and resin. This precipitate is either crystalline or amorphous, accordingly as a solution was hot or cold when precipitated. If the solution be concentrated until about equal to twice the weight of opium employed, and ammonia added to the boiling liquid, with constant stirring, the resin is precipitated, melts and adheres firmly to the sides of the containing vessel or to the glass rod used for stirring. The liquid can then be poured off immediately, when the morphia, etc., will begin to be precipitated owing to the change of temperature. The crystals so obtained are free from the resin and light-brown in color. The morphia is not entirely precipitated by ammonia from infusion of opium, owing to the solubility of morphia in water and in ammonia. If the ammonia be added in slight excess only, and the liquid allowed to stand until the smell of the ammonia has disappeared, then the amount of morphia left in solution should correspond to the amount of liquid used, unless there be any constituent in the infusion of opium which prevents the complete precipitation of morphia. This, according Prof. Dragendorff, is the case. The following experiments, however, tend to prove that, provided the excess of ammonia be nearly driven off, the amount of morphia left in solution is in direct accordance with its solubility in water.

6·48 grams of dried Turkey opium were exhausted with water, and concentrated to 35 cc. It yielded ·800 gram of morphia. The solution, which with the wash water measured 70 cc., was shaken repeatedly with fusel oil; fusel oil removed and evaporated. The residue

was treated with dilute acid and precipitated with ammonia. This last operation was performed entirely with about 10 cc. of liquid. It yielded ·067 gram of morphia, which with ·010 to be added for loss of morphia in the 10 cc. of liquid, gave ·077 or only ·005 gram in excess of the theoretical quantity, which may be accounted for, as the morphia was not quite free from color.

Five grams of Persian opium treated as above yielded ·460 gram of morphia, and 50 cc. of liquid was used. This, treated by amylic alcohol, gave ·053 gram of morphia.

6·480 grams of a very rich sample of Persian opium gave .907 of morphia, 6·80 cc. of wash water were used. This, by treatment with amylic alcohol, yielded ·087 gram of morphia.

There is, however, one point in connection with the precipitation of morphia by ammonia to which special attention must be paid. It is that solutions of opium from which the morphia has been precipitated by slight excess of ammonia, if left to stand until the smell of ammonia has disappeared, redissolve a large quantity of the precipitate, so that care must be taken that the liquid should always have a *slight excess* of ammonia present. It is, I believe, to the neglect of this fact that Prof. Dragendorff has made the statement that opium contains some ingredient which hinders the precipitation of the morphia.

When, however, ammonia in strong excess was allowed to remain in the liquid, the amount of morphia extracted by amylic alcohol was much greater, in one case as much as 3 per cent.

If the opium before treating with water has been mixed with chalk, then the precipitate obtained by ammonia consists of morphia, narcotina and resin, the meconate of calcium being entirely got rid of. If the opium has been treated with boiling benzin, bisulphide of carbon or ether, previous to infusion, then the precipitate consists of morphia, meconate of calcium, resin and minute quantities of other alkaloids. The following experiment will illustrate the difference in composition of the precipitate under these different circumstances.

No. 1. 6·480 grams of dried opium treated with cold water, the solution evaporated to half an ounce, ammonia added in slight excess and allowed to stand twenty-four hours, gave 1·695 gram of precipitate; of this 1·506 was soluble in boiling alcohol. The alcoholic residue, etc., treated with bisulphide of carbon, lost ·358 gram. The remainder dissolved in dilute acid, and treated with slight excess of ammonia, yielded ·870 gram of morphia.

No. 2. 6.480 grams mixed with chalk, and treated as above, gave 1·258 of precipitate by ammonia; of this 1·200 was soluble in alcohol, ·267 soluble in bisulphide of carbon and ·858 of morphia.

No. 3. 6·480 grams treated with bisulphide of carbon, and afterwards exhausted with water, yielded 1·332 gram of precipitate by ammonia, of which 1·137 was soluble in alcohol, and ·008 in bisulphide of carbon and yielded ·880 of morphia.

From this it will be seen—

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Precipitate by Ammonia, . . . | 26·06. | 19·6 | 20·5 | 18·3 |
| Portion soluble in Alcohol, . . . | 23·08 | 18·5 | 17·2 | 16·1 |
| " " $CS_2$ . . . | 5·5 | 4·1 | 0·1 | |
| Morphia contained in precipitate, . . | 13·28 | 13·25 | 13·59 | 13·7 |

That a large quantity of morphia escapes precipitation by ammonia is a point strongly to be remembered, as in the case of a bad opium containining only from 2 to 4 per cent. of morphia, more morphia might remain in the liquid than was precipitated.

It has been proposed to take the weight of the precipitate given by ammonia as a criterion of the goodness of opium, and good opium should certainly not give less than 14 to 15 per cent. of it, but it should be borne in mind that it does not contain more than half its weight of morphia.

If ammonia be added to infusion of opium (which has been acidified with hydrochloric acid) until exactly neutral, the resin and meconate of calcium are precipitated, whilst soluble hydrochlorate of morphia remains in solution; the precipitate can then be filtered off and then ammonia be added to the filtrate in slight excess; a light-colored precipitate is obtained, which consists of morphia and narcotina in a very pure form.

Potash, soda and lime, added to infusion of opium, cause a precipitate of narcotina, and resin, and meconate of calcium, but the morphia is dissolved by the excess of alkali present. If the solution be filtered quickly the morphia soon separates out, and is in a very pure form, but there is some loss in the process, as I have never been able to recover by this means as much morphia as by other processes. Lime water also dissolves narcotina to some extent, provided morphia be present.

*Action of Heat on Morphia.*—If morphia or its salts be boiled with water for some time the solution becomes colored; if acids in excess

be present the action is more marked, whilst with alkalies the action is stronger still, and a flocculent-brown precipitate is soon formed. The following experiments may prove useful as showing that, provided allowance be made for the solubility of morphia in water, the precipitate is complete:

I took ·583 gr. of pure morphia, dissolved in acid and treated with slight excess of ammonia. After twenty-four hours the precipitate was collected, dried and weighed; it gave ·552 gr. of morphia; the wash water was 30 cc., equivalent to ·030 of morphia, thus making the total ·582 gr.

·113 gr. of pure morphia, treated as above, gave ·100 gr. of precipitate and 13 cc. of liquid, which would correspond to ·013 gr. of morphia, thus making the total ·113.

Ammonia added to tincture of opium, or to an alcoholic solution of the precipitate produced by ammonia, produces a precipitate of part of the morphia and part of the narcotina present, the amount remaining in solution depending on the strength and quantity of the alcoholic liquid; if the liquid be tincture of opium, then the precipitate contains meconate of calcium.

PART II.—In commencing my criticisms on the processes in use I will begin with the most simple, and then proceed to describe others more complicated.

Arnoldi's process ("Jour. Chem. Soc.," 1874). Opium is exhausted with water, the solution treated with animal charcoal, concentrated and precipitated by ammonia. The precipitate is collected, dried and weighed as impure morphia. The author states that good opium should yield above 14 per cent.

The objections are:

1. That the morphia is not entirely precipitated by ammonia.

2. That the precipitate, though called impure morphia, does not contain much more than half its weight of ammonia.

3. The use of animal charcoal ensures loss of alkaloid, as the undermentioned experiment will prove:

2·435 grams of pure morphia were dissolved in acid and boiled with animal charcoal. The morphia was precipitated, and the amount obtained, allowing for loss by solubility, was 2·405 gr., thus indicating a loss of over 1 per cent.

A second experiment showed even a higher loss.

The process given by Professor Flückiger in the "Pharmacographia" is better, but far from perfect. It is as follows: Opium is exhausted by boiling ether, the residue dried, treated with water, and precipitated by ammonia. This precipitate recrystallized from boiling alcohol.

Professor Flückiger himself describes the process as imperfect, and gives his reasons. He is one of the very few who seem to have taken notice of the loss of morphia by virtue of its solubility and of its destruction by heat. The chief objections to the process are:

1. The long continued boiling with ether (twenty or thirty times repeated with fresh quantities) takes away some of the morphia, and care must be taken that the ether employed is free from alcohol and water.

2. The loss of morphia by virtue of its solubility.

3. In crystallizing from alcohol much morphia remains in solution, but the crystals deposited are very pure.

The small proportions of morphia found by Professor Flückiger tend to prove the correctness of these statements.

Guibourt's process ("Journal de Pharmacie et Chimie") consists in exhausting opium with water, precipitating by ammonia, and washing the precipitate first with dilute alcohol to remove narcotina and coloring matter, and afterwards dissolving the morphia by means of strong alcohol. The alcoholic solution is evaporated, dried and weighed.

The objections to this process are loss of morphia by washing the precipitate with dilute alcohol, and in the precipitation with ammonia.

The residue obtained by the evaporation of the alcoholic solution is not pure morphia, but contains narcotina and resin.

Schacht's process ("Archiv der Pharmacie," 1863). The process is an improvement on the last mentioned. It consists in exhausting opium with water by two or three macerations, treating with animal charcoal, concentrating, and adding ammonia. The precipitate is weighed, treated with ether, and the etherial solution evaporated and weighed. The portion insoluble in ether is treated with strong alcohol, the alcoholic solution evaporated, dried and weighed; or it is washed with water and dilute alcohol and again weighed, the weight being taken as pure morphia.

This process has the following objections:

1. The amount of water used by macerating three successive times

necessitates long applications of heat for evaporating, which tends to destroy the morphia. The meconic acid present is also split up and forms other colored matters, which help to make the morphia impure.

2. The animal charcoal used retains alkaloid.

3. If the alcoholic solution be evaporated, the results are high, as it contains coloring matter and resin.

4. If washed with alcohol (dilute) and water, morphia is dissolved away.

5. No mention is made of the morphia lost in precipitating.

It is, however, the best of those processes in which water is used alone as a solvent, and by slightly modifying, as follows, can be made to produce very good results.

The solution from which the morphia has been precipitated by ammonia should either be measured and allowance made for the morphia dissolved, or it should be treated with amylic alcohol as before described.

1. The opium should be first treated with benzin, as by that means less water is required for exhaustion, and the marc should be percolated, not macerated.

2. The use of animal charcoal should be precluded, the morphia being purified by being dissolved in acid, made neutral, filtered, and then adding ammonia.

The process devised by Merck, consists in exhausting with water, and precipitating by means of carbonate of soda and heat. The precipitate is dissolved in acetic acid and made neutral, filtered, and excess of ammonia added.

This process has the following objections:

1. The alkali and heat cause destruction of the morphia.

2. No account is taken of the loss by precipitation. It has the advantage that the method of purification proposed avoids loss of morphia.

Guillermond's process consists in treating opium with alcohol, and adding ammonia to the alcoholic solution. The morphia so produced is very pure, but as a large quantity remains dissolved in the alcohol, it is only a comparative method. The precipiate also contains meconate of calcium.

The process of Staples, which consists in adding alcohol to concentrated infusion of opium, then after filtration mixing more alcohol and ammonia, is also open to the same objections as the last.

The process of Mohr which has been adopted, with slight modifications, by the compilers of the B. P., consists in exhausting opium with water, mixing with milk of lime and boiling; the filtered liquid is mixed with hydrochloric acid and concentrated. It is then made exactly neutral with ammonia, filtered, and mixed with exeess of ammonia; the precipitate dried and weighed. This process, if properly and carefully carried out, is one of the best, as, by the use of lime, the resin and meconate of calcium, also meconic acid, is removed from solution. The objections to it are:

1. That the large quantity of water used and the subsequent evaporations cause loss of morphia.

2. That no account is taken of the loss of morphia by non-precipitation.

The modifications I would introduce are as follows:

1. The opium should be first treated with bisulphide of carbon or benzin.

2. The dried residue should then be mixed with its own weight of lime and two or three times its bulk of some inert powder, such as pumice or glass. It is then to be percolated with water, the first part of percolate being returned as fast as it runs through. By this means much less water will be required to exhaust the opium than would otherwise be the case. After the opium is exhausted, which will be known by the liquid dropping through devoid of taste, the solution should be exactly neutralized with dilute sulphuric acid and filtered and the precipitate washed. The clear solution is then to be evaporated over a water-bath until its bulk is about half an ounce, and again filtered if requisite; then ammonia is to be added in slight excess, and the liquid allowed to stand twenty-four hours. The precipitate can then be collected, washed with ether, and dried, and to the amount found must be added the amount corresponding to the quantity of water used in precipitating and washing. The morphia obtained by this process is of a dull white color, crystalline, perfectly soluble in alcohol, acids and alkalies.

In concluding these few remarks, which I hope may prove useful, as indicating which methods are most likely to give correct results, I beg to state that I do not consider the subject in any way exhausted, and that I still intend to work upon opium analysis, and hope to communicate further results at another meeting of the Conference.

Table showing amount of morphia obtained by different processes on samples of dried powdered opium:

| | Arnoldi. | Flückiger. | Guibourt. | Schacht. | Schacht Improved. | Guillermond. | B. P. | B. P. Improved. |
|---|---|---|---|---|---|---|---|---|
| Turkish, . . . | 26 | 9·5 | 10·2 | 11·0 | 12·8 | 9·8 | 12·1 | 13·0 |
| Persian, . . . | 25 | 8·0 | 9·0 | 11·0 | 13·0 | 8·7 | 12·3 | 13·4 |
| Indian, . . . | 15 | 3·0 | 3·6 | 4·0 | 5·2 | 3·2 | 4·9 | 5·6 |

## GLEANINGS FROM THE FOREIGN JOURNALS.

BY THE EDITOR.

*Vanillin from Wood-tar.*—Reimer observed a reaction which is common to all phenols, by which the latter are transformed into aromatic aldehyds. Phenol is mixed with chloroform and an excess of soda solution; after the reaction the excess of undecomposed chloroform is distilled off and an acid added, when salicylic aldehyd is produced, which may be purified by combining with sodium bisulphite and liberation by an acid. Guaiacol treated in the same way yields vanillin, the aldehyd of vanillic acid. Gorup-Besanez found (1867) guaiacol to be one of the constituents of beech wood-tar creasote.—*Phar. Cent. Halle*, No. 31.

*To distinguish beech-tar creasote from coal-tar creasote*, Professor R. Boettger recommends to dissolve one drop of the creasote in 40 cc. (10 fluidrachms) of distilled water, and add a few drops of a concentrated solution of ferric chloride. The appearance, after a few minutes, of a dirty brownish-yellow coloration indicates the presence of Reichenbach's beech-tar creasote, while a faint blueish violet coloration is proof of the presence of carbolic acid.—*Phar. Cent. Halle*, No. 33.

*The tænifuge properties of pumpkin-seed*, according to Heckel, reside in the perisperm. Ferd. Vigier, however, states that the seeds lose nothing of their activity by being deprived of their perisperm, according to his experiments made with the seeds of Cucurbita maxima, which is the species most frequently met with in Paris. He prepares an emulsion from 60 grams of the seeds deprived of the perisperm, 20

of sugar, 10 of orange flower water and 160 of distilled water. This potion is to be followed by a purgative.—*L'Union Phar.*, June.

*Bowdichia major*, *Mart.*, is a large tree of Brazil, where it is known under the names of sicopira, sebipira, subupira, etc. An exudation appears in the spring, and hardens to pieces resembling Senega gum. This sicopira gum was described by Peckolt in 1862, and contains besides 14 per cent. of moisture, 4 resin, 3 tannin, 31 gum and 44 of a bassorin-like substance. It is used in diarrhœa.

The soluble constituents of the wood are tannin, gum and resin. The trunk-bark contains much tannin and some of the constituents found in the root-bark. It was formerly employed medicinally, but has fallen into disuse, while the more active bark of the root, introduced by Dr. J. A. Vieira de Mattos, is successfully employed in Brazil in various skin diseases; it is given in the form of alcoholic extract, in doses of 0·15 gram, 3 to 6 times daily, and as alcoholic tincture (1 bark to 4 alcohol), by mixing 30 grams with 300 grams of syrup, in tablespoonful doses, repeated thrice daily.

Th. Peckolt, of Rio, describes the root-bark as either red-brown (sicopira vermelha) or flesh-colored (sic. branca), the latter coming chiefly from the Campos region, district of Serro, province of Minas Geraes. The latter is very difficult to obtain, but is preferred for medicinal use.

On treating the red-brown etherial extract of the bark with cold alcohol of 32°, a fine crystalline mass of *sicopirin* is left behind, which has a bitter somewhat biting taste, is soluble in ether and boiling alcohol, but almost insoluble in water; when treated with diluted sulphuric acid it yields glucose. Prof. Geuther found its elementary composition to be $C_{16}H_{12}O_5$.

The fresh root-bark from the province of Rio de Janeiro yields only 0·019 per cent. of sicopirin. Peckolt found also 9·1 per cent. of bitter principle and extractive, soluble in alcohol and water, 8·88 per cent. of resins and smaller quantities of gum, starch, tannin and albumen.

The bark from the Campos region contains more sicopirin, and if this should prove to be the active principle, would obviously be more active than the red-brown bark.—*Zeitschr. Oest. Ap. Ver.*, No. 19.

*The therapeutic value of the crystalline principles of aloes* has been the subject of investigation, by Nelson C. Dobson and Wm. A. Tilden, who arrived at the following results:

Barbaloin, nataloin and zanaloin are more or less aperient in doses of two grains, barbaloin being, apparently, rather more active in combination with hard soap than with conserve of roses. They are, each of them, decidedly uncertain and variable in their action; the time which elapsed after the administration before there was any perceptible action varied from 2½ to 15 hours. The crystalline principle did not appear to be more potent than a similar dose of aloes, nor was any advantage discovered over a similar dose of aloes, except, perhaps, that griping was less common than when aloes alone was given.—*Phar. Jour. and Trans.*, Aug. 19, from *Med. Times and Gaz.*, Aug. 12.

*Adulterated Arrowroot.*—H. Wm. Jones states that a considerable quantity of arrowroot, adulterated with cassava starch, is in the (English) market at the present time. Similar adulterations have been previously noticed in France, by Guibourt.—*Phar. Jour. and Trans.*, July 8.

*Estimation of Quinia from Ferri et Quiniæ Citras.*—A. N. Palmer observed that the quinia in this preparation cannot be reliably determined by ammonia and ether. But by employing chloroform as the solvent for the alkaloid, the whole amount can be obtained, even in the presence of sugar, glycerin or ammonium citrate. If ammonia is used for liberating the quinia, the liquid will show an alkaline reaction long before the whole of the quinia has been precipitated.—*Ibid.*, July 29.

A. J. Cownley, however, shows that the failure of ether to extract the whole of the quinia is, most likely, due to the solubility of this liquid and water, and that, practically, the whole of the quinia can be obtained if the liquid is repeatedly agitated with ether.—*Ibid.*, Aug. 5.

*Soluble Prussian blue*, in a durable liquid form, is obtained by dissolving 5 grams of ferrocyanide of potassium, 5 grams of iron potassa alum ($KFe2SO_4$. $12H_2O$) and 1 gram borax, in 200 grams of distilled water, adding 5 or 6 grams of pure diluted nitric acid, and afterwards 2 grams of liquor ferri sesquichlorati, "Phar. Germ." (spec. grav. 1·480 to 1·484; contains 15 per cent. of iron).—*Apoth. Zeit.*, No. 31.

*Codliver oil with ferrous iodide* is prepared by triturating in a mortar 1 part each of iodine and pulverized iron and 20 parts of codliver oil; the mixture is then heated in a water-bath until the brown color of the iodine has completely disappeared and given place to a deep purple

color, when 60 parts more of the oil are added, and the liquid, after standing, is decanted and kept in well-corked bottles sheltered from the light.

It differs in taste but little from the ordinary medicinal codliver oil. Exposed to the light, it changes after a few days to a red-brown color, indicating the liberation of iodine. Taste and color furnish a good criterion for its condition. It is well not to prepare too much in advance.—*Phar. Jour. and Trans.*, July 8th, from *Nieu Tydschr. voor de Phar. in Nederland.*

*Colorless Tincture of Iodine.*—Schönbein states that ammonium hypoiodite is formed when iodine acts upon an excess of ammonia. The hypoiodite reacting with alcohol produces iodoform in the same manner as chloroform is formed by the action of calcium hypochlorite upon alcohol. In preparing the colorless tincture from iodine, ammonia-water and alcohol, Wm. H. Darling has separated some iodoform, and attributes the efficacy of this tincture, for the most part, to the iodoform.—*Ibid*, July 15.

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## MEDICINAL GUM RESINS OF PERSIA.

### Ammoniacum (*Dorema Ammoniacum, Don.*)

This resin is called *Uschekh* in Persia. The plant grows on plateaux and mountain slopes in the cold climate (Serdesir or Jeylak). I found it on the far-stretching plateaux between Mahiar and Yezdechast, especially between Aminabad and Yezdechast, where, together with some Salsola, it nearly covered the whole plain. But it also grows in an easterly direction from Ispahan, in the district of Ardistan, by the station Najin (on the route to Yezd). According to the authority of the inhabitants, it puts forth leaves and sprouts towards the end of March; the leaves develop quickly, dry just as rapidly, and serve as excellent food for sheep, which eat them with avidity. When I passed through the plateau on the 25th of June, 1859, I only saw fallen leaves, resembling those of celery, blown about by the wind. The stems, however, attain a height of about six feet, and I could easily reach the tops of them on horseback. The blossoming season was already over, but the sticky seeds were still young, round and full of sap (not flattened as at the end of the journey); above all, there were on the plants and tops small tears of gum resin. The bare stems, about one and a half to

two inches thick, which I cut through, were so full of resin that a thick sap ran over ; later on, after exposure to the air, it thickens and becomes of a yellowish-brown color. There are, however, some plants which give no gum and bear no fruit. The inhabitants call these male plants, while they term the fruit-bearing ones female plants. The maximum temperature on this day was 25°C. The saline well-water boiled at 94½°C. On my return journey, on the 1st of August, I found, in the same place, that most of the seeds had been blown away by the wind, but many of the plants still bore their fruit, so that I succeeded in obtaining several pounds without dismounting ; ripe as they were, and carefully as I guarded them, they would not germinate in Europe. On this day the temperature after sunrise was 15°, the maximum 29°C. Gum ammoniacum is in this district abundantly gathered, and sold in Ispahan. In the country it is much used as an inward medicament, and also frequently for greasing the spinning-wheels, as it is very cheap. The plant is, above all, an excellent food for sheep. At the Vienna Exhibition there was a lump of gum ammoniac, shown in Morocco, stated to be obtained in that country.

Galbanum resin (*Ferula galbanum*) is called Barzed and Baredsche in Persian, and Khasni in Turkish (though the name Khasni is also used in some Persian districts). This plant requires a greater elevation above the level of the sea than the ammoniacum. I found it at a height between 7,000 and 8,000 feet on the mountains adjoining the Valley of the Laar, where I collected a few ounces of the best galbanum. It is also frequently found on the mountains by the village of Dehgirdu, at an elevation of 6,000 feet. The leaves resemble the other ferulas in their structure. When I passed by the village on the 27th of June, 1859, the leaves had already fallen, but the flowers had not yet developed their light-orange color. The plants were covered with tears of resin ; the root was of a roundish form and about the same size and shape as a large black radish, with two spreading shoots. The temperature on this day (27th of June) was, in Dehgirdu, before sunrise 7°C., at mid-day 21°C. Water boiled at 92½°C. Galbanum is frequently used for plasters, and inwardly for menstrual illnesses, in the country ; it is also exported from the above district to Constantinople under the name of Khasni.

*Ferula Asafœtida*, Lin.—In Persian the resin is called Anguze (from which the abbreviation asa. may have been derived). In Arabian

it is called Heltit mumtin. In former times it was very frequently found on the Trachyt mountains, between Ispahan and Mahiar, to which place the collectors came from Mischhed in Khorassan. At the commencement of spring they surrounded the stem with a wall of stones, placed a pot over it, and thus collected the resin. Gradually the collectors became fewer and fewer, as hardly any plants remained for propagation, and at last it was entirely deserted. It is, however, found in abundance between Abadeh and Murgab. Round about Abadeh, where in spring-time the sheep feed on the leaves, the milk and the butter are of such a disgusting odor, that only the natives can use them. It is also abundant from Dschendak in Khorassan to Herat. An Englishman brought me sprouts, which were covered all over with asafœtida tears. In the district of Herat the gum is collected in a regular manner: in spring the plants are dug round, about the 20th of May the stalk near the roots is cut through the middle, and after three days the resin is scraped off. Three days later a horizontal segment is again cut off, and then the resin is collected in three days. This process is repeated four times. It appears that this plant requires a warm climate and a low sea level.

The uses of the resin are manifold. The largest quantity is exported to India, where it is employed for culinary purposes; it is a frequent ingredient in the sauce for pillaus. The Turcomans are very fond of the young shoots dipped in vinegar. Its medical uses in Perisa are very numerous. I know people there who are so accustomed to the anguze for nervous complaints, that it is, like opium to opium-eaters, one of the necessaries of life. Its excellent antispasmodic qualities are too little known in Europe. I have also heard that in many districts the fields are surrounded with anguze, in order to protect the plants from the depredations of insects.

*Ferula Sagapenum.*—This gum is called Sagbinedsch in Persian, from which sagapenum is derived. I could only learn that this plant is common in the mountains of Luristan, and the gum is collected at that spot. The character of the resin, which resembles the *Asa dulcis*, as well as the seeds which are found in the resin, is characteristic of the family of Ferula.—*Jour of Appl. Sci.*, Aug. 1, 1876.

## SERUM- AND EGG-ALBUMIN AND THEIR COMPOUNDS.

BY A. HEYNSIUS.

After recapitulating the results of his former paper (Jour. Chem. Soc. [2], xiii, 469), the author brings forward objections to Schmidt's view, that albumin is a substance of itself soluble in water (see this Journal [2], xiv, 87—89). Schmidt obtained by dialysis a neutral liquid, which did not coagulate on heating, and contained no soluble ash-constituents. The author's objections to Schmidt's conclusion are:

1. A neutral reaction does not necessarily mean entire absence of alkali, inasmuch as alkali can combine with egg-white without causing the reaction to become alkaline. This is proved by experiment. After long-continued dialysing a liquid was obtained, which became turbid at lower temperatures than that obtained after a shorter process of dialysing; because in the former case the alkali was more completely removed.

2. The failure of Schmidt to obtain any soluble salts from the liquid, which he regarded as a solution of pure albumin, is ascribed to the small quantity of material employed. It is shown by experiment that an amount of alkali, which is so small as to be unrecognized in the ash of such quantities of liquid as Schmidt employed, is sufficient to prevent coagulation of albumin (blood-serum and egg-white) on heating. A minute trace of acid also prevents coagulation.

$\frac{4}{10}$ths cc. of $\frac{1}{1000}$ normal alkali (=0·0000124 grm.) caused dialysed blood-serum to remain clear on boiling. 2 cc. of the same solution (=0·000062 grm. alkali) prevented coagulation of dialysed egg-white. $\frac{7}{10}$ths and $\frac{6}{10}$ths of cc. of $\frac{1}{100}$ normal acid solution respectively prevented coagulation in blood-serum and in egg-white.

It is further urged that the small quantity of alkali present in dialysed albumin will most probably be found in the insoluble ash, inasmuch as it is known that alkali—especially soda—when heated with phosphates of the earths, gives insoluble double salts.

The author concludes that, after the most careful dialysing, there is obtained:—1. A compound of albumin with calcium (and magnesium) phosphate, which is soluble in water, and from which albumin is precipitated on boiling. 2. That albumin free from salts cannot be obtained by dialysis, and that we are not therefore justified in saying that albumin is of itself soluble in water. 3. That with this compound there is associated (in the case of blood-serum, at

least) a small quantity of albumin combined with soda, which alkali prevents to a greater or less extent, according to the quantity in which it is present, the coagulation alike of the albumin combined with itself, and of that combined with calcium phosphate, when the liquid is heated.

The compound of albumin with calcium (and magnesium) phosphate is possessed of the following properties:

1. It is decomposed by acids and by alkalis, the albumin remaining in solution; the more concentrated the solution, the total quantity of albumin remaining unchanged, the greater is the quantity of alkali or of acid needed for decomposition.

2. It has an extremely faint acid reaction, becoming visible only after many hours.

3. Probably different compounds are formed, according as serum or egg-albumin is employed.

4. The compound is decomposed by warming; the longer dialysing has been continued, the lower is the temperature of decomposition; 50° was the lowest point noticed when distilled water was used in dialysing.

5. The decomposition temperature is raised not only by the addition of acid or alkali, but also by neutral salts.

There is no difference between the albumin obtained from this compound by the action of alkalis, and that found combined with alkalis in genuine egg-white.

The third part of this paper discusses the influence of alkalis and of acids upon albumins. It is shown that the quantity of acid or of alkali required to keep albumin in solution, on boiling, is influenced by the presence of neutral salts (NaCl was chiefly examined); that with a small quantity of sodium chloride the solvent influence of acids is marked, but with a large quantity of sodium chloride alkalis exercise a more distinctly solvent action. The albumin remains in these cases in the uncoagulated form. The stronger acids, as nitric, exercise a more marked solvent action than the weaker, as acetic, in the presence of an unvarying quantity of sodium chloride. Tables are given, containing the results of experiments with different acids and varying quantities of salts, especially sodium and calcium chlorides, upon albumin.—*Jour. Chem. Soc.*, August, from *Pflüger's Arch. f. Physiol.* xii, 549-596.

# VARIETIES.

FRENCH PHARMACEUTICAL STATISTICS. — According to the recent statistics, quoted in the last issue of the *Bulletin Commercial*, there are at the present time in France 2,121 pharmaciens of the first class and 4,089 of the second class being a total of 6,210 pharmaciens. Ten years since, in 1866, there were 2,457 of the first class, and 3,346 of the second, or altogether 5,803 pharmaciens. Next to the department of the Seine, in which alone there are 820 pharmaciens (495 first class and 325 second), the departments having the highest number of pharmacists are the Bouches-du-Rhone, Gironde, Nord, Seine-Inférieure, Seine-et Oise, Var, and Haute-Garonne. Between the 1st of January, 1803, and the 1st of January, 1876, the superior schools, the medical juries, and the preparatory schools of pharmacy have conferred no less than 16,650 degrees of pharmacien of which 6,462 have been of the first class and 10,188 of the second. On the average there is now in France one pharmacy to 10,000 inhabitants and a territorial area of 2,000 hectares.—*Phar. Jour. and Trans*,

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THE NUMBER OF PHARMACIES IN ST. PETERSBURG is leagally regulated, so that for every 12,000 inhabitants one apothecary store may be established, and each store should on an average of three succeeding years, put up 30,000 prescriptions. According to statistical computations of the Russian department of the Interior, the inhabitants of St. Petersburg are only 3,471 in excess over the number fixed for the apothecary stores, and the prescriptions compounded by the latter, during the three years, 1873 to 1875 inclusive, averaged only 29,785; the establishment of new stores will for these reasons, at present, not be permitted.—*Apoth. Zeit.*, No. 21.

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MEDICAL STATISTICS OF WURTTEMBERG.—In 1866 the number of physicians was 447, residing in 191 communities, or one for every 3,970 inhabitants; towns and cities of over 5,000 inhabitants had one physician for 1,334, and the country one for 5,898 of the population. In 1876 the number of physicians had increased to 500, who resided in 194 localities; 1,464 of the population of towns and cities, and 5,971 of the country population, have now one physician.—*Phar. Zeitung.*

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M. J. SCHLEIDEN, the well-known botanist and pharmacologist, celebrated the fiftieth anniversary of his doctorate, August 20th.

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SULPHIDE OF CARBON AS AN INSECTICIDE.—The use of carbon sulphide is, recommended by J. B. Schnetzler, of the Lausanne Academy, as a means of destroying the insects which infest herbaria and entomological collections. The Academy collection of Swiss flowering plants having been attacked by *Anobium paniceum*, M. Schnetzler had a wooden box made large enough to contain five fasciculi of the herbarium, each composed of about 200 plants. Four ounces of carbon sulphide were poured into the five fasciculi; the box was tightly closed, and the whole left for a month. All the insects were destroyed, and no injury was done to the specimens, or to the papers to which they were fastened. The expense of the operation

is very small. M. Schnetzler recommends that the boxes should be placed under a shed, as in case of the escape of vapor there might be danger of explosion. The same process may be employed for collections of insects.—*Pop. Sci. Mo.*, Oct., 1876.

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Ointment for Burns.—Dr. Bedford Brown, in an article on burns, recommends the following treatment to allay pain and promote the process of healing:

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|---|---|
| Take iodoform, . . . | 2 dr. |
| Spermaceti ointment, . . . | 1 oz. |
| Extract of conium, . . . | 1½ dr. |
| Carbolic acid, . . . . | 10 drops. |

This, spread on fine linen, is applied twice daily to the inflamed surface, and then enveloped in oiled silk, no other dressing being required. In cases where there is great dryness of surface from destruction of vitality and want of exhalation, the wound, before applying the ointment, should be coated with the common linimentum calcis, which affords a soft and moist dressing, and in no wise interferes with the action of the iodoform. The iodoform acts as a certain and most effective sedative on the painful and exposed surface, and at the same time as an antiseptic. It reduces inflammation and suppuration, when in excess, in a remarkable manner, promptly converting a most painful and irritable wound into one that is comparatively painless. It is also an excellent promoter of healthy action and the healing process, and has besides the great advantage of rendering the use of anodynes unnecessary.—*Philadelphia Medical Times.*

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Test for Bilious Urine.—O. Rosenbach recommends in "Med. Centr. Bl.," the following as the easiest and a very reliable test for bile in urine:

Urine is filtered through white filtering paper; if it contains bile the paper will be colored lively yellow till nearly brown. Now let one drop of pure concentrated nitric acid run down the side of the still moist filter; it will, in the presence of bile, leave a yellow streak, which soon turns orange with a violet border, and outside of this dark-blue and emerald-green. These colors stay sometimes for hours.

Urine, otherwise dark-colored, but not containing bile, does not show this display of colors.—*Ny Phar. Tid.*, 1876, p. 195. H. M. W.

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Artificial Coloring of Wines.—Since the vintage of 1875, the artificial coloring of wines in France has attained such a development as to raise fears not only for the good name of French wines, but also for the public health. The Syndicate of wine merchants of Paris has taken the matter up and urged it upon the attention of the French Government in a vigorously written memorial, in which it is roundly asserted that the sole object of the coloring is so to treat a wine, at an insignificant cost, that it may be sold considerably above its real value. Formerly coloring was only done to a small extent and with vegetable and comparatively inoffensive matters, but now it is stated, hundreds of kilograms of arsenical fuchsin and other equally poisonous substances are used for the purpose and the sale of such preparations is openly advertised. The Syndicate urges that it is useless to discuss in chemical laboratories whether fuchsin itself, or asenical fuchsine when diluted to

a certain extent, is poisonous or not, there being no guarantee against the greediness of the wine colorer. One result of the agitation has been that the officers of *octroi* have been ordered to take samples, for analysis, of all red wines coming into Paris.—*Phar. Jour. and Trans.*, Sept. 23.

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PRESERVATION OF SYRUPS BY SALICYLIC ACID.—Mr. Lajoux, a Paris pharmacien, has been making some experiments with the object of ascertaining the minimum quantity of salicylic acid by which the fermentation of syrups can be prevented during the summer. The syrups experimented upon were red-currant, cherry, mulberry, capillaire, gentian and compound ipecacuanha. It was found necessary to add a quantity of salicylic acid equal to one thousandth part of the weight of the sugar in the syrup. Syrups thus prepared were kept simply covered with a sheet of paper at a mean temperature of about 17°C. At the end of two months they were intact, whilst the same syrups, placed in the same conditions, but without salicylic acid, were completely altered.—*Phar. Jour. and Trans.*, Sept. 16.

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TEST FOR SUGAR.—Vidau has observed that a mixture of equal parts of hydrochloric acid and oil of benne (*Ol. Sesami*), either in the cold, or when slightly heated, assumes a distinct rose-color in the presence of cane or grape sugar, provided not less than 0·001 gm. ($\frac{1}{64}$ gr.) of sugar is present for every c.c. (16·3 min.) of mixture.—*Journ. de Ph. et d. Chim.*

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CHROMIC INKS.—As long ago as 1848, Professor F. Runge invented what he called a chromic ink, from its containing chromate of potash. His directions for its preparations, published at the time in Dingler's *Journal*, were as follows: A decoration of logwood is first made in the proportion of 10 to 80, that is 10 lbs. of logwood is boiled with enough water to produce 80 lbs. of the decoction. To 1,000 parts of this logwood extract, when cold, is added 1 part of yellow chromate of potash, stirring rapidly. It is ready for use at once. Gum and other additions are injurious, he says, to this ink.

The following year W. Stein proposed an improvement on Runge's ink, saying that the great fault of this ink was that it soon became thick, like sour milk. This he overcame by adding four grains of corrosive sublimate to each bottle. This would restore thick ink to its pristine quality, and improve its color changing it from deep indigo blue to pure black.

In 1867, C. Puscher described a new ink similar to the above, made as follows: Boil 10 ozs. of logwood in 20 ozs. of water, then boil again in 20 ozs. more of water, and mix the two decoctions; add 2 ozs. of chrome alum and boil another quarter of an hour. One oz. of gum arabic is added, and we have 25 oz. of deep black ink.

Böttger says that a simple method of preventing gelatinizing in chromic ink is to add to the water in which the extract is made some carbonate of soda. His method of operation is as follows: Dissolve 15 parts of extract of logwood in 1,000 parts of distilled water to which 4 parts of carbonate of soda has been added at boiling heat, and add 1 part of yellow chromate of potash, dissolve in a little water.—*Scientific American*, Nov. 4th.

SOAP-ROOT. — A large commerce is carried on from California in a fibrous substance known as soap-root. It is obtained from a lily-like plant, a species of Phalangium (*Chlorogalum pomeridianum*, Kunth,) which is met with about the mountains, and attains a height of eight feet. The heavy bulb is covered with many coatings, consisting of fibres, which are used for cushions, mattresses, etc. Large contracts are entered into for the supply of this material on a very extensive scale. The inner part of the bulb serves as a substitute for soap, and it might be tried whether it can be utilized for technological purposes like the root of *saponaria*.—*Drug. Cir. and Chem. Gaz*

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A PANIC AMONG SPONGE DIVERS.—Advices from Beyrout state that the last crop of Turkey sponge was very deficient, and prices of ordinary and common sponges have greatly risen in consequence. The deficiency is attributed to a panic among the divers, caused by the appearance in the neighborhood of Batroun, Mount Lebanon—the chief sponge fishing locality—of a sea monster, alleged to have been equal in size to a small boat. Its actual depredations among the divers appear at the present time to have been limited to one man, whom he is said to have swallowed whole.—*Drug. Cir. and Chem. Gaz.*

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# MINUTES OF THE PHARMACEUTICAL MEETING.

The first meeting of the session was held October 17th, 1876, Prof. Remington in the chair. An election for Registrar was held, resulting in the re-election of William McIntyre. The minutes of the last meeting were read and approved. The chairman introduced the strangers and students present, and urged all to continue their attendance. The following presentations were made: From the Chinese Commission to the Centennial Exposition, the Catalogue of the Chinese Imperial Maritime Customs Collection at the United States International Exhibition, Philadelphia, 1876. From Henry S. Wellcome, a handsome framed drawing of Eriodyction Californicum, the "Yerba santa" or "mountain balm" of California, which is recommended as an efficient remedy for lung diseases.

A. P. Brown read a paper describing a new method of preparing Syrup of Liquorice Root and Brown Mixture (See page 487.) He had also made and used Ammoniacal Glycyrrhizin to mask the bittter taste of quinia; two drachms of the glycyrrhizin are dissolved in one pint of sprup, then to each fluidrachm is added one grain of quinia sulphate. In making ammoniacal glycyrrhizin care must be observed to use chemically pure sulphuric acid in the precipitation, and in the preparation of the compound mixture of liquorice, by the process suggested, an excess of ammonia must be avoided.

In answer to an inquiry as to what is sweet syrup of quinia as used in Baltimore, the chairman suggested that it might be a mixture of syrup and tannate of quinia, the objections to which he stated, or one of undissolved sulphate of quinia in very thick syrup.

P. P. Fox exhibited a sample of ground flaxseed made in a Swift's drug mill. It had occurred to him that a rough way of estimating any admixture of cake meal was by measurement—the ground flaxseed being lighter than the cakemeal, one quart of the former, loosely measured, was found to weigh 12½ to 14 ounces, and of the latter 16 ounces avoirdupois. Prof. Remington said a more accurate way would be the determination of the amount of oil in the sample.

C. J. Biddle stated that the Philadelphia Hospital cakemeal is always used with the addition of olive oil in making the cataplasms.

Boldo bark and leaves were exhibited by C. J. Biddle, who read a number of articles from various journals, descriptive of the drug and its tonic properties, with a decided action upon the liver; in this country it was stated to have been experimented with by Dr. Zaremba, of Chicago.

On motion, adjourned, to meet on November 21st, 1876.

WILLIAM MCINTYRE, *Registrar.*

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# PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

ALUMNI ASSOCIATION OF THE PHILADELPHIA COLLEGE OF PHARMACY.—A stated monthly meeting was held at the College Hall, October 5th, 1876. President Kennedy stated that the object of the meetings of which this was the first, was to elicit by informal discussion the various practical hints derived from the experience of each one, which, as a whole, contribute so materially to the knowledge of the competent pharmacist.

A paper was read from Mr. Wm. McIntyre, on the solubility of quinia in mixtures of ammonia and alcohol, and formulæ given from several authorities. (See p. 488.) Salicylic acid claimed some attention. Salicylated cotton wadding, the process for which was given by Mr. Mitchell, is a convenient mode of applying that agent; it contains two per cent. of the acid.

Mr. Kennedy spoke of a false fucus sold for the true gulf weed, Sargassum bacciferum. Changes in prescriptions, syrup of wild cherry and other subjects occupied the meeting until its adjournment.

WALLACE PROCTER, *Secretary.*

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MARYLAND COLLEGE OF PHARMACY.—The building recently purchased was formally dedicated October 13th, Hon. L. H. Steiner, M. D, of Frederick, who was formerly Professor of Chemistry in the College, delivering the dedicatory address in his usually eloquent style. He reviewed the past history of the College; congratulated the members on their valuable possession, and prophesied a bright and useful future for the College. A goodly number of ladies were sprinkled through the audience and several distingulshed persons occupied seats near the speaker. On the conclusion of Prof. Steiner's address, Mayor Latrobe spoke in the highest commendation of the institution and expressed satisfaction in having aided the Trustees in the consummation of the purchase, and expressed the belief that the present school was even of more public benefit than the one which recently occupied the building. After benediction was pronounced by Dr. Dalrymple, the company repaired to

Guy's Hotel, where a sumptuous feast had been prepared, which was highly enjoyed by those present.

The building, though the oldest public school edifice of Baltimore, is still in excellent condition, having been erected in the most substantial manner. It is commodious, well ventilated and pleasantly located, and in every way well suited for the uses of the College. The lot is 74 ft. x 100 ft., the building 45 ft. x 75 ft. It was erected in 1830 for Male Grammar School No. 3, and was latterly occupied by Female Grammar School, No. 3. It was purchased at the very reasonable sum of $2,009, with an annual ground rent of $109, in consideration of the uses to which it was to be applied, and in order to secure this advantage Messrs. Sharp & Dohme volunteered to advance the necessary sum as a loan to the College; but before the time to make the payment the entire amount had been secured by subscription, and enough more to put the building in good repair. Thus the College has entered on a new era, out of debt, and in a building well adapted for lecture and other necessary purposes.

We congratulate our Maryland friends at their success, and hope that the other pharmaceutical colleges which are still without a habitation of their own may soon be equally successful in securing a permanent home.

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THE NETHERLAND PHARMACEUTICAL SOCIETY held its twenty-eighth annual meeting at Amsterdam, June 22d. It consists at present of 190 members, with Mr. A. J. Rijk, of Amsterdam, President. A resolution was passed declaring that the advertising of remedies for diseases was in conflict with the true and dignified practice of pharmacy. A plan submitted by Mr. Opcoijrda, endeavoring a greater uniformity in the charges for prescriptions, was adopted.

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THE GERMAN APOTHECARIES' SOCIETY held its fifth annual meeting at Stuttgart, Sept. 6th and 7th, Director Wolfrum, of Augsburg, presiding. The report of the Directory gives an account of its activity during the past year; it advocates a representation of the Society in the administrative departments of the State and each district, and gives a copy of the draft of a law concerning the establishment and moving of pharmacies, which had been submitted to the various governments; also, a memorial to the governments in relation to the proposed trade law. The Society has now 2,750 members. The vacancies in the Directory occasioned by the resignation of Messrs. Schacht and Hartmann were filled by the election of Messrs. Brauweiler and Wimmel. A resolution was passed recommending a permanent commission on the "Pharmacopœia."

In accordance with the proposition of Dr. Leube, the Society voted for each district (19 in number) a contribution of 10 marks to the Hanbury memorial in London. Resolutions were passed admitting the pharmacists of Alsace and Lorraine on favorable terms; appropriating money, if necessary, to promote the exhibitions in connection with the annual meetings; charging the Directory with the preparation of a memorial concerning the traffic with secret medicines, and with its presentation to the proper authority; recommending the separation, at the various universities, of the professorship of pharmacy from that of general chemistry, and the cre-

ation of a chair of practical chemistry, which should be filled by a practical pharmacist; also, one declaring in favor of saleable concessions for pharmacies, and of their limitation according to the actual need.

Two scientific lectures were delivered by Prof. Fraas on the geology of Wurttemberg, and by Prof. Reichardt on the examination of atmospheric air for ozone and hydrocarbon.

The next meeting will be held at Leipzig.

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FRENCH PHARMACEUTICAL SOCIETY.—At the Congress of the Local Pharmaceutical Societies of France, held at Clermont, August 17th to 19th, the formation of a general pharmaceutical society was resolved upon, and a resolution passed recommending the extension of the apprenticeship to four years, and the compulsory examination of assistants.

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PHARMACEUTICAL SOCIETY OF NEW SOUTH WALES.—We learn from the "Pharm. Journal" that such a society has been established for the purpose of uniting the chemists and druggists in that colony "in one ostensible, recognized and independent body for protecting their general interests, and for the advancement of pharmacy by furnishing such a uniform system of education as shall secure the profession and the public the safest and most efficient administration of medicines."

The new society has speedily obtained legislative recognition, and an act has been passed entrusting to a Board of Pharmacy, elected from the council of the society, power to control all matters relating to the conduct of pharmacy, sale of poisons, etc., throughout the colony.

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# EDITORIAL DEPARTMENT.

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THE SANITARY CONDITION OF PHILADELPHIA DURING THE INTERNATIONAL EXHIBITION.—In the June number, p. 283, we published a circular from the *Bureau of Medical Service*, organized in connection with the Centennial Exposition, in which the average mortality, during the past four of five years, of six cities of over 500,000 inhabitants was given, showing that the average death rate was lowest in Philadelphia. This condition has not been materially altered during the past summer months, notwithstanding the protracted heat during a part of that time, and although the influx from strangers was quite considerable; the following circular, issued by the same bureau, will give further account:

*Bureau of Medical Service.*—In a former circular issued from this Department, the exceptionably favorable position which is occupied by Philadelphia, in comparison with the other great cities of the world (*i. e*, cities containing over 500,000 inhabitants), in regard to its sanitary advantages and average rate of mortality, was shown by carefully prepared statistics. In anticipation of the unusually large number of visitors who would undoubtedly be present in the city during the continuance of the International Exhibition, great efforts were made by the municipal authorities as well as by those in charge of the Exhibition Grounds, to obviate every cause of disease. The details of these arrangements will be published in the official reports of the various departments, which will appear after the close of the Exhibition.

It is owing to their thoroughness that, despite the very severe and prolonged heat of June and July, and the vast number of unacclimated strangers constantly present in Philadelphia since the 10th of May, the general health of the city has been remarkably favorable. With the exception of the four weeks ending July 22, the range of temperature for the past five months has been about the average. Thus, for the entire period of 20 weeks since May 10, the mean daily temperature has been 71·30° F., while the average for the same months during the past ten years has been 71·82° F. The mean temperature of the four weeks referred to (ending July 22), on the other hand, was 80°, 83°, 83° and 81° respectively, giving an average for the month of 81·75° against 75·5° F., the mean temperature of the corresponding period of the previous year.

The following table, showing the relative mortality of Philadelphia and some of the larger American and European cities, has been prepared with strict care from the official records. The periods selected for comparison correspond as closely as possible. It will be seen, on careful examination, that the past season has not been an unfavorable one.

| CITIES. | Estimated Population. | Number of weeks included and date in 1876. | Average mortality per week from Typhoid Fever and Diarrhœal Affections. | Average mortality per week from Zymotic Diseases. | Average mortality per week from all causes. | Annual death rate per 1,000 during week from Typhoid Fever and Diarrhœal Affection. | Annual death rate per 1,000 during week from Zymotic Diseases. | Annual death rate per 1,000 during week from all causes. |
|---|---|---|---|---|---|---|---|---|
| London..... | 3,254,260 | 1875. 26 weeks, including the quarter ending June 19th and that ending Sept. 26th. | 105 5 | 291 | 14674 | 1·66 | 4·62 | 23 40 |
| Philadelphia..... | 900,000 | 20 weeks, from week ending May 13th to week ending Sept. 23d, 1876. | 83·8 | 112 | 406·5 | 4 84 | 6·47 | 23·48 |
| Chicago ..... | 420,000 | 17 weeks, from week ending May 13th to the week ending Sept. 9th. | 52 | 80 | 196 | 6·44 | 9·9 | 24 27 |
| Boston..... | 342,000 | 18 weeks, from week ending May 13th to the week ending Sept. 9th, 1876. | 36·7 | 57·4 | 161 | 5·56 | 8·73 | 24·48 |
| Baltimore..... | 360,000 | 19 weeks, from week ending May 13th to the week ending Sept. 16th, 1876. | 48·9 | 58·1 | 172·36 | 6·91 | 8 37 | 24·80 |
| Paris ..... | 1,851,792 | 26 weeks, including the quarter ending June 25th and Sept. 24th, 1875. | 64 | 115 | 896 | 1·76 | | 25·16 |
| Brooklyn..... | 506,233 | 19 weeks, from week ending May 13th to the week ending Sept 23d, 1876. | 75·7 | | 262 | 7·74 | 11·81 | 26·91 |
| New York..... | 1,064,236 | 18 weeks, from week ending May 13th to the week ending Sept. 16th, 1876. | 174·9 | 262 | 629·7 | 8·52 | 12·79 | 30·73 |
| Berlin..... | 950,000 | 26 weeks, including the quarter ending June 30th and Sept. 30th, 1873. | 201 | | 626 | 1092 | | 34·32 |

It will be further observed that, as in the table published in the former circular, Philadelphia occupies an exceptionally favorable position With the exception of London, whose rate of mortality is nearly identical, Philadelphia presents a considerably lower rate than any other of the great cities, while, in comparison with its nearest neighbors, New York and Brooklyn, its superiority is both striking and suggestive.

In calculating the rate of mortality in Philadelphia during the past twenty weeks, the population has been estimated at 900,000. Those who have carefully studied the movement of its population, expect, however, that, in consequence of the large influx of visitors, this estimate is below rather than above the mean daily population. It must further be borne in mind that, while a considerable portion of its more favored classes were, as usual, absent from Philadelphia during the summer months, the lower classes, among whom the mortality is always greater at this season of year, were largely reinforced. If, in addition to this, it be considered that a comparatively large amount of sickness might have been expected among the vast throngs of unacclimated visitors reaching the city after long and hurried journeys, and exposed to excitement and excessive fatigue, the full significance of the remarkable table above given will, it is hoped, be appreciated by all. As one of the most important factors in the maintenance of public health, is the purity of the water supply, it is with great satisfaction that we learn from the official report furnished by Dr. Charles M. Cresson, the distinguished analytical chemist, that the purity of the water supplied from the Schuylkill River to the Exposition Grounds and the neighborhood is fully up to the standard of the past four years.

As the summer months, during which time alone any fears could be entertained for the development of wide-spread disease, have passed with such gratifying results, it is not premature to express the feeling of thankfulness and congratulation that during this important year Philadelphia has been favored with the same exceptionally low rate of mortality she has so long enjoyed.

WILLIAM PEPPER, Medical Director.

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# REVIEWS AND BIBLIOGRAPHICAL NOTICES.

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*Chemistry: General, Medical and Pharmaceutical,* including the Chemistry of the "U. S. Pharmacopœia." A manual on the general principles of the science and their applications in medicine and pharmacy. By John Attfield, Ph.D., F.C.S., etc. Seventh edition. Philadelphia: Henry C. Lea, 1876. 12mo, pp. 668.

Since 1871, when the first American edition of this work was published, two more editions have been issued in this country, the volume before us being the third, leaving four editions which appeared in England between the years 1867 and 1875. The favor with which this work has been received in both countries is alone proof of its great utility; and, after having used it as a text-book in the laboratory of the Philadelphia College of Pharmacy during the last five years, we can speak from our own experience and testify to its intrinsic value in the practical instruction of the student. The more we have used it, the more we were pleased with it, and on the appearance of a new revised and enlarged edition, we take occasion to again cordially recommend it, believing that for the practical instruction of pharmaceutical students in chemistry it has no superior in the English language.

This seventh edition is considerably enlarged and improved, and is embellished with eighty-seven illustrations, each one being of practical utility in aiding the student in the performance of investigations. On page 386 we notice an omission to notice an improvement introduced in the last "U. S. Pharmacopœia." It is stated there, that in the process for preparing resina podophylli no acid was ordered. This was correct for the former "Pharmacopœia," but not for the present one.

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*Chemia Coartata, or the key to modern chemistry.* By A. W. Kollmyer, A.M., M D., Professor of Materia Medica and Therapeutics at the University of Bishop's College; Professor of Materia Medica and Pharmacy at the Montreal College of Pharmacy, and late Professor of Chemistry, etc. Philadelphia: Lindsay & Blakiston. pp. 111. Price, cloth, $2.25.

The author intends this work as a useful aid to those who, from business occupation or from any other circumstance, may not have sufficient time at their disposal to consult more voluminous works, and it has therefore been his main object to compress into as small a space as possible everything connected with chemistry that deserves attention, and to give no more explanatory matter than is actually required. This aim has been well carried out, the text leaving nothing to desire in regard to briefness and, at the same time, sufficient clearness, to enable the advanced student to comprehend the intention of the author. The information given

is on the whole correct, but it may well be questioned whether for the production of some of the rarer metals other more productive processes should not have been indicated; whether for the preparation of carbonic acid gas, instead of chalk and sulphuric acid, the (in the laboratory) more convenient source from marble and hydrochloric acid should not have been mentioned, and whether, in view of the immense production of bromine from the mother-liquors of the salt brines, that source should not have been given in addition to sea water.

Inorganic chemistry occupies the first 72 pages; the following 30 pages are devoted to organic chemistry, and this is followed by a synopsis of poisons, their antidotes and general treatment. The tabular arrangement has been adopted wherever practicable, and a ready and convenient way is thus afforded for comparison.

The work is very well adapted for the purposes for which it has been prepared, and it will be found very useful by those who have learned the old notation and wish to become acquainted not only with the new notation, but also with the principles and theories which have led to the very general adoption of what is called the modern system of chemistry. We would not recommend it to students for general use, but we commend it to their careful examination with the view of learning therefrom how comprehensible and, at the same time, concise notes and excerpts from larger works may be made, so as to profit as much as possible from a close application to study.

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*Micro-photographs in Histology, Normal and Pathological.* By Carl Seiler, M.D., in conjunction with J. Gibbons Hunt, M.D. and Joseph G. Richardson, M.D. Philadelphia: J. H. Coates & Co. Price, 60 cts. per number, $6.00 per annum.

Parts IV and V contain hepatic cells from liver of a fly, leukaemia of the liver, blood corpuscles of man and of the ox, fat cells from mesentery of a cat, kidney of a mouse, chronic nephritis, Malpighian tufts and crystals of urea. The plates are well executed, and each one is accompanied by descriptive text.

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*Du M'Boundou on Poison d'épreuve du Gabon.* Par Léon Kauffeisen. Montpellier, 1876. 4to, pp. 55.

On the M'Boundou, or the ordeal poison of Gabon.

A very creditable thesis, presented and publicly sustained before the Ecole supérieure de Montpellier, August 14, 1876, for obtaining the degree of Pharmacist of the first class.

The *m'boundou*, also known as *casa*, *icaja* or *boundou*, is a shrub indigenous to equatorial Africa, and has been variously referred to the family of Apocynaceæ and Loganiaceæ, the latter view being taken by Duchaillu, Griffon du Bellay and John Torrey, of New York, and seems to be the correct one as far as can be judged from the results of the author's chemical investigation, which resulted in the isolation of strychnia, while brucia appears to be absent.

In the first chapter of his essay, the author gives some notes of the uses to which the article is put in its native country, and states that large doses of palm-oil are there known to act as an antidote, or rather, as a preservative against its toxical effects. Descriptions of the roots and leaves are likewise given.

Chapter II refers to the physiological experiments made with boundou in France, and gives the yield of 13 extracts made with different menstrua from the wood, bark and leaves. The experiments made with these preparations upon rabbits and frogs, detailed in the third chapter, proved that 0·025 gram of the extracts resulted in the death of the frog after five minutes with the aqueous, and in ten minutes with the etherial extract of the bark. The remaining extracts were somewhat weaker, and the etherial and alcoholic extracts of the wood produced the same effect only after 6 hours and 23 minutes and 7 hours and 45 minutes respectively.

The last chapter treats of the chemical examination, the principal result of which has been mentioned above.

*Specimen Fasciculus of a Catalogue of the National Medical Library*, under the direction of the Surgeon-General U. S. A. at Washington, D. C. Government Printing-office, 1876. 4to, pp. 72.

The praiseworthy efforts which have been made to establish as complete as possible a National Medical Library has been so far successful, that at the beginning of the present year it contained about 40,000 volumes and about the same number of single pamphlets. It is the Medical Section of the Library of Congress, and now under the direction of the Surgeon-General U. S. A., in connection with the Army or National Medical Museum. To make such a library really as useful as it should be, a good catalogue is absolutely necessary, and the specimen fasciculus now before us proves that its preparation has been entrusted to competent hands. It is to be hoped that Congress will appropriate a sufficient sum of money to have the whole catalogue printed, which will doubtless be very voluminous, its comprehensiveness being such that page 72 closes with the subject *Air* (*atmospheric*).

The Library includes, also, works on pharmacy, and there are at present missing in it only the January and July numbers of the "American Journal of Pharmacy," for 1857, to make that serial complete. If any of our readers should be able to supply them, the Librarian, Surgeon John S. Billings, U. S. A., will either pay a fair price for them or furnish in exchange from the valuable publications of the Surgeon-General's Office.

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*Nüchterne Betrachtungen über die in Frage stehende Reform des Pharmaceutischen Lehrplanes in Oesterreich.* Von P. R Stolzissi, Apotheker in Waizenkirchen. Wels: Joh. Haas, 1876. 8vo, pp. 37.

Sober considerations on the projected reform of the pharmaceutical education in Austria.

This pampelet is more than of local interest, since it discusses a question which has on several occasions also come up in this country, namely, the relation and sequence of the practical instruction in the store and the theoretical instruction at a college or university.

A plan had been proposed for Austria, according to which the apprenticeship of the pharmacist was to be reduced to two years, to be followed by one year's instruction at a special school, and subsequently by a prolonged attendance at a university. As might have been expected, such a plan aroused the opposition of those pharmacists who do not take lightly the duty of training the young apprentices entrusted to their care, and who naturally expect a fair and equitable recompense for their care and trouble. But the question is of far deeper importance, involving the possibility of *becoming* a good and reliable pharmacist in the short space of two years, even though the standard of preliminary education be as high as it is demanded in many European countries, and likewise the possibility of *remaining* a reliable pharmacist after having discarded the practical business duties for several years' theoretical study at the university. Mr. Reithammer addressed letters of inquiry to a number of the most prominent apothecaries and pharmaceutical teachers. Schroff had proposed a greater extent of store practice, and his views like those advocated by Reithammer and the author are, in the main points, coincident with those expressed in the answers of such well-known men as Danckwortt, Dragendorff, Duflos, Flückiger and many others. The pamphlet contains in full the answers received from Wittstein, Hager, Landerer, Hirzel, Ladé and of one teacher at a pharmaceutical institute of a university, whose name is withheld, but can, we think, be readily guessed by those who are acquainted with his valuable contributions to science. With singular unanimity they advocate an apprenticeship of not less than three years, and afterwards a service as assistant of from one to three years previous to the academical course. The duration of the latter should, in the opinion of the majority of those named above, not be *fixed* at more than three semestres preceding the admission to the examination; indeed, Hager lays particular stress upon a *long*

*service* in the business, and points out the fact that many of the best and learned (German) pharmacists had attended but two semestres' university instruction after their apprenticeship, and a service as assistants in different places of from 5 to 10 years; and he closes his letter with the following proposition, which is well worthy of consideration: *Experientia est optima rerum magistra!*

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*Medicinal Plants*, being descriptions with original figures of the principal plants employed in medicine, and an account of their properties and uses. By Robert Bentley, F.L.S. and Henry Trimen, F.L.S. Philadelphia: Lindsay & Blakiston. Price, $2.00 per part.

Parts IV and V of this instructive and useful work contain the handsomely-executed colored plates, together with the descriptive text of the following medicinal plants: Brassica nigra and alba, Linum usitatissimum, Ruta graveolens, Citrus limonum, Paullinia sorbilis, Dorema Aucheri, Boissier (a plant not previously figured, which affords very good ammoniacum), Helleborus niger, Chondodendron tomentosum, Hæmatoxylon campechianum, Brayera anthelmintica, Datura stramonium, Atropa belladonna and Ficus carica.

The descriptions of the botanical characters, habitat, properties and uses are, as in the preceding numbers, full and accurate.

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# OBITUARY.

ALEXANDER KING and SAMUEL B. SPENCE, both promising young men and members of the graduating class of 1874 of the Philadelphia College of Pharmacy, died recently, the former at Canandaigua, N. Y., on September 10, the latter at Fond du Lac, Wis., on October 8, both being in their twenty-sixth year, and falling victims to that scourge, pulmonary phthisis.

Mr. King was born at Jersey City, and lost his father, Rev. David King of the Old Wall street church, New York, at the age of three years, and soon afterwards also his mother. He was reared by his father's parents, and educated at the Canandaigua Academy. At the age of fourteen he entered the store of his uncle, Wm. King, Jr., at Buffalo, and in 1872 came to Philadelphia to attend the College of Pharmacy. After graduation, he returned to his uncle, and remained with him until a few months ago, when his health began to fail rapidly, admonishing him to seek rest and change at his former home, where he succumbed.

Mr. Spence learned the drug business with Kalk & Kent, of his native city, and after spending two winters at Philadelphia, and graduating, returned to Fond du Lac, where soon after symptoms made their appearance inducing him to seek for a change of climate in California, hoping that the mountain air might stay the advances of the disease Not attaining the desired relief, he returned home last summer to die among his kindred.

Both deceased were of retiring disposition, quiet and unobtrusive in their demeanor, and left records of uprightedness behind them. Both wrote, on graduation, creditable theses, the one by Mr. King, announcing the discovery of morin and mori-tannic acid in Maclura aurantiaca, having been published in this journal in June, 1874.

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JOHN B. CRESSON, aged 59 years, a member of the Philadelphia College of Pharmacy, died October 23d, 1876. His entire life was spent in this his native city. He was much respected for his moral worth and uniform gentlemanly bearing.

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MARSHALL S. COWPERTHWAITE died July 29 of pneumonia at Burlington, N. J., and was buried near Medford, his native place. He was opprenticed to John A. Vandegrift, Burlington, and last winter attended the lectures at the Philadelphia College of Pharmacy, giving promise of future usefulness.